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## (54) 【発明の名称】対枝管作業方法および枝管遮閉装置

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## 【特許請求の範囲】

【請求項1】 (1) 流体輸送用の本管(A)に分岐接続された枝管(B)の中間に介装された仕切弁(2)により、前記枝管(B)を遮断する工程、  
 (2) 前記枝管(B)の端部に装着された端末装置(1)を取り外す工程、  
 (3) 前記枝管(B)の端部に蓋体(4)を装着してその枝管(B)の端部開口を閉塞する工程、  
 (4) 前記仕切弁(2)を開放する工程、  
 (5) 前記蓋体(4)を密封状態で軸芯方向に摺動自在に貫通する操作軸(5A)を摺動操作してその操作軸(5A)の内端側に設けた閉塞具(5B)を前記仕切弁(2)よりも上流側部分にまで移動させる工程、  
 (6) 前記操作軸(5A)の内端側に取り付けた前記閉塞具(5B)の一対の押圧板(5c), (5d)を軸芯方向で接

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近移動操作することにより、その押圧板(5c), (5d)の間に介装した弾性リング状体(5f)を軸芯方向から挾圧して枝管(B)の内周壁に密着する拡径状態に弾性変形させることで前記枝管(B)を閉塞する工程、

- (7) 前記仕切弁(2)を取り外す工程、
- (8) メンテナンス作業済み、または、新しい仕切弁(2)を取り付ける工程、
- (9) 前記押圧板(5c), (5d)による弾性リング状体(5f)に対する挾圧を解除して閉塞具(5B)による前記枝管(B)の閉塞を解除する工程、
- (10) 前記閉塞具(5B)を前記蓋体(4)内に収容されるまで移動させる工程、
- (11) 前記仕切弁(2)により前記枝管(B)を遮断したのち、前記蓋体(4)を取り外す工程、
- (12) 端末装置(1)を装着したのち、前記仕切弁

(2) を開放する工程、  
からなる対枝管作業方法であつて、前記〈9〉の工程  
が、  
〈9-イ〉前記閉塞具(5B)よりも下流側の枝管(B)  
の内部圧を、前記閉塞具(B)よりも上流側の枝管  
(B)の内部圧にほぼ等しくする工程、  
および、

〈9-ロ〉前記押圧板(5c), (5d)による弾性リング  
状体(5f)に対する挾圧を解除する工程、  
とからなるものである対枝管作業方法。

【請求項2】流体輸送用の本管(A)に分岐接続され、  
かつ、その中間に仕切弁(2)が介装された枝管(B)  
の端部開口を閉塞するようにその仕切弁(2)の下流側  
端部またはそれに接続する管部分の端部に装着可能な蓋  
体(4)と、この蓋体(4)を密封状態で軸芯方向に摺  
動自在に貫通する筒状の第1操作軸(5a)と、この第1  
操作軸(5a)内を摺動自在に貫通する第2操作軸(5b)  
とを設け、それら第1操作軸(5a)および第2操作軸  
(5b)の内端側に各別の押圧板(5c), (5d)を取り付  
けるとともに、それら一対の押圧板(5c), (5d)の間  
に、それら一対の押圧板(5c), (5d)による軸芯方向  
からの挾圧で前記枝管(B)の内周壁に密着する拡径状  
態に弾性変形してその内周壁と前記一対の押圧板(5  
c), (5d)の外周部との間を遮閉する弾性リング状体  
(5f)を介装してある枝管遮閉装置において、前記一対  
の押圧板(5c), (5d)のうちの下流側に位置するもの  
または前記枝管(B)の内周壁と前記弾性リング状体  
(5f)との当接部に、前記一対の押圧板(5c), (5d)  
による前記弾性リング状体(5f)に対する挾圧力が所定  
以下になることで前記流体を前記弾性リング状体(5f)  
の上流側から下流側へ通過させるように開く流路(F)  
を形成してある枝管遮閉装置。

#### 【発明の詳細な説明】

##### 〔産業上の利用分野〕

本発明は、例えば、水道本管に分岐接続された消火栓や  
空気弁等の端末装置用の枝管の途中に介装された止水用  
の仕切弁を、水道本管での送水を行ながらも枝管からの  
漏洩を防止した状態で交換するといった対枝管作業方  
法、および、その方法に用いられる枝管遮閉装置に関す  
る。

さらに詳しくは、方法については、

- 〈1〉流体輸送用の本管に分岐接続された枝管の中間に  
介装された仕切弁により、前記枝管を遮断する工程、
- 〈2〉前記枝管の端部に装着された端末装置を取り外す  
工程、
- 〈3〉前記枝管の端部に蓋体を装着してその枝管の端部  
開口を閉塞する工程、
- 〈4〉前記仕切弁を開放する工程、
- 〈5〉前記蓋体を密封状態で軸芯方向に摺動自在に貫通  
する操作軸を摺動操作してその操作軸の内端側に設けた

閉塞具を前記仕切弁よりも上流部分にまで移動させる工  
程、

〈6〉前記操作軸の内端側に取り付けた一対の押圧板を  
軸芯方向で接近移動操作することにより、その押圧板の  
間に介装した弾性リング状態を軸芯方向から挾圧して枝  
管の内周壁に密着する拡径状態に弾性変形させることで  
前記枝管を閉塞する工程、

〈7〉前記仕切弁を取り外す工程、

〈8〉メンテナンス作業済み、または、新しい仕切弁を  
取り付ける工程、

- 10 〈9〉前記押圧板による弾性リング状体に対する挾圧を  
解除して閉塞具による前記枝管の閉塞を解除する工程、
- 〈10〉前記閉塞具を前記蓋体内に収容されるまで移動さ  
せる工程、
- 〈11〉前記仕切弁により前記枝管を遮断したのち、前記  
蓋体を取り外す工程、
- 〈12〉端末装置を装着したのち、前記仕切弁を開放する  
工程、

からなる対枝管作業方法に関する。  
20 他方、装置については、流体輸送用の本管に分岐接続さ  
れ、かつ、その中間に仕切弁が介装された枝管の端部開  
口を閉塞するようにその仕切弁の下流側端部またはそれ  
に接続する管部分の端部に装着可能な蓋体と、この蓋体  
を密封状態で軸芯方向に摺動自在に貫通する筒状の第1  
操作軸と、この第1操作軸内を摺動自在に貫通する第2  
操作軸とを設け、それら第1操作軸および第2操作軸の  
内端側に各別の押圧板を取り付けるとともに、それら一  
対の押圧板の間に、それら一対の押圧板による軸芯方向  
からの挾圧で前記枝管の内周壁に密着する拡径状態に弾  
性変形してその内周壁と前記一対の押圧板の外周部との  
間を遮閉する弾性リング状体を介装してある枝管遮閉裝  
置に関する。

#### 〔従来の技術〕

上述した枝管に介装の仕切弁の交換等の対枝管作業を行  
う際、従来では、前述した〈9〉の工程において、新し  
い仕切弁を取り付けたのち、閉塞具による枝管の閉塞  
を、その閉塞具の弾性リング状体に対する軸芯方向から  
の挾圧力を緩めて枝管の内周壁との間に隙間が生じる縮  
径状態に弾性復元変形させることで解除するようにして  
いた（文献を挙げることができない）。

#### 〔発明が解決しようとする問題点〕

しかし、上述した従来の方法による場合には、次のよう  
な問題があった。

つまり、メンテナンス済みまたは新しい仕切弁を取り付  
けた状態では、弾性リング状体に対して、上流側の流体  
圧と下流側の大気圧との差圧がその弾性リング状体を枝  
管の内周壁および下流側の押圧板に押し付ける力として  
作用しているため、押圧板による弾性リング状体に対す  
る挾圧を解除しても、弾性リング状体は、前記の差圧に  
よって下流側の押圧板および枝管の内周壁に押し付けら

れて密着する状態に保持され、枝管の閉塞解除がスムーズに行われなくなりがちであり、特に流体を本管内に高圧で輸送している場合には著しい作業効率が低下を来すものであった。

本第1発明の目的は、従来実情に鑑み、枝管の閉塞解除をスムーズに行うことのできる対枝管作業方法を提供することにあり、本第2発明の目的は、そのような対枝管作業方法に用いるに有用な枝管遮閉装置を提供することにある。

#### [問題点を解決するための手段]

本第1発明による対枝管作業方法の特徴は、メンテナンス済み、または、新しい仕切弁を取り付けたのち、閉塞具による枝管の閉塞を解除する工程が、

〈イ〉 閉塞具よりも下流側の枝管の内部圧を、前記閉塞具より上流側の枝管の内部圧にはほぼ等しくする工程、および、

〈ロ〉 前記押圧板による弾性リング状体に対する挾圧を解除する工程、  
とからなることにある。

#### [作用]

つまり、本第1発明の対枝管作業方法によれば、枝管の閉塞を解除するにあたって、その閉塞具の上流側と下流側との内部圧がほぼ同じになるから、押圧板による弾性リング状体に対する挾圧を解除したときに、弾性リング状体をそれに対する下流側の押圧板および枝管の内周壁に押し付けることとなる枝管の内部圧の差圧に起因した力が殆どなくなり、弾性リング状体は、枝管の内周壁との間に隙間が生じる縮径状態に容易に弾性復元変形する。

#### [発明の効果]

その結果、たとえ流体を本管内に高圧で輸送する状況にあっても、弾性リング状体に対する挾圧を解除することで枝管の閉塞解除をスムースに行うことができ、仕切弁のメンテナンスや交換といった対枝管作業の効率を向上させることができるようになった。

#### [問題点を解決するための手段]

本第2発明による枝管遮閉装置の特徴構成は、弾性リング状体を軸芯方向からの挾圧で枝管の内周壁に密着する拡径状態に弾性変形させるための一対の押圧板のうちの下流側に位置するものまたは枝管の内周壁と前記弾性リング状体との当接部に、前記一対の押圧板による前記弾性リング状体に対する挾圧力が所定以下になることで流体を前記弾性リング状体の上流側から下流側へ通過させるように開く流路を形成したことにある。

#### [作用]

つまり、本第2発明の枝管遮閉装置を用いれば、一対の押圧板による弾性リング状体に対する挾圧力が所定以下になることで流路が開かれて流体が弾性リング状体の上流側から下流側へ通過するから、弾性リング状体の両側における枝管の内部圧がほぼ同じになって弾性リング状

10 する挾圧力を暖めるだけで行える。

#### [発明の効果]

その結果、枝管に介装された仕切弁等に対するメンテナンスや交換等を行うにあたって、本第2発明による枝管遮閉装置を用いることによって、メンテナンス作業済み、または、新たな仕切弁等を取り付けた後の枝管の閉塞の解除を、弾性リング状体の両側の内部圧をほぼ同じにすることでスムースに行えるから、その作業効率を向上させることができる。

しかも、そのための構成を、この種の装置が本来的に有する部品の若干の改造で得ることができるから、例えば、弾性リング状体の両側を連通するバイパス流路とそれを開閉するための弁等を設けるといった大がかりな装置の設置を不要にできてコスト的に有利であり、かつ、作業スペースの増大化を回避できる。さらに、枝管の閉塞解除のために、弾性リング状体に対する挾圧力を暖める操作以外に弾性リング状体の両側の内部圧をほぼ同じにするための特別の操作を必要としないから、従来と同じ操作感覚で、かつ、操作忘れの虞なく作業を行うことができる。

30 従って、全体として、対枝管作業を流体輸送を継続しつつ行う際に用いる枝管遮閉装置として操作面ならびにコスト面の何れにおいても優れたものを提供できた。

#### [実施例]

以下、図面に基づいて、本発明の実施例を説明する。まず、本第1発明による対枝管作業方法の説明に先立つて、それに用いる本第2発明による枝管遮閉装置を説明する。

この枝管遮閉装置は、第3図に示すように、地中に埋設の水道本管(A)に分岐接続され、かつ、その端部に空気弁(1)を接続するとともに、中間に仕切弁の一例である止水弁(2)を介装した枝管(B)の前記止水弁(2)を交換する場合において、前記枝管(B)のうち止水弁(2)の上流側の管部分(3)を、前記止水弁(2)の交換を許容する状態で止水するための装置であって、止水器(5)と、固定手段(6)とから構成されている。

なお、前記枝管(B)は、水道本管(A)のフランジ付T字管に一端側の大口径部でフランジ接続する人孔フタ(B<sub>1</sub>)と、この人孔フタ(B<sub>1</sub>)の小口径端部に一端側においてフランジ接続する前記止水弁(2)の弁箱(B<sub>2</sub>)

体が枝管の内周壁との間に隙間が生じる縮径状態に障害少なく弾性復元変形する。

しかも、上述した枝管の閉塞の解除をスムーズに行わせるための弾性リング状体の上流側と下流側との等圧化が、この種の装置に本来的に備えられている一対の押圧板のうちの下流側に位置するものまたは枝管の内周壁と弾性リング状体との当接部に流路を設けることでできるようになっているから、それら構成部品に対して若干の改造を加えるだけでよく、しかも、弾性リング状体に対

と、この弁箱（B<sub>2</sub>）の他端部にフランジ接続する空気弁取付用の短管（B<sub>3</sub>）とから構成されており、止水対象となる上流側管部分（3）は、前記人孔フタ（B<sub>1</sub>）の小径管部分である。

前記蓋体（4）は、第1図（ロ）および第2図に示すように、前記止水弁（2）の、短管（B<sub>3</sub>）が取り外された他端部開口を閉塞するようにその止水弁（2）の他端部にフランジ接続可能で、かつ、前記止水器（5）を内装可能な容器状のものである。

前記止水器（5）は、第1図（ホ）および第2図に示すように、前記蓋体（4）の軸芯部を水密状態で軸芯方向に摺動自在に貫通する操作軸（5A）と、この操作軸（5A）の内端側に取り付けた閉塞具（5B）とから成っている。

前記操作軸（5A）は、筒状の第1操作軸（5a）と、この第1操作軸（5a）内を水密状態に貫通する第2操作軸（5b）とから成っている。

前記閉塞具（5B）は、前記操作軸（5A）のうちの第1操作軸（5a）の内端に取り付けた第1の押圧板（5c）と、前記操作軸（5A）のうちの第2操作軸（5b）の内端部にスライド自在に外嵌させた第2の押圧板（5d）よりも内端側に取り付けられて、前記第2操作軸（5b）の第1操作軸（5a）に対する外端側の軸芯方向摺動により、前記第2の押圧板（5d）を第1の押圧板（5a）に接近移動させる押圧操作具（5e）と、前記第2の押圧板（5d）の接近移動に伴って両押圧板（5c），（5d）で軸芯方向から挟圧されて、両閉塞板（5c），（5d）の外周部と上流側管部分（3）の内周壁との隙間を閉塞するように弾性的に拡径変形する弾性リング状体（5f）とから成っている。

そして、前記両押圧板（5c），（5d）は、枝管（B）内を軸芯方向に移動できるように枝管（B）の最小内径よりも小径に形成されており、また、弾性リング状体（5f）も、同様に、挟圧が解除された自然状態において前記枝管（B）の最小内径よりも小径になるように形成されている。また、第2の押圧板（5d）には、弾性リング状体（5f）と係合保持する脱落防止用の突起（5g）が形成されている。

前記弾性リング状体（5f）には、第4図および第5図に示すように、その第1の押圧板（5c）側に、周方向に沿って複数の切欠き（5x）が形成されている。この切欠き（5x）は、挟圧状態では弾性リング状体（5f）の弾性変形で閉鎖され、挟圧力が所定以下の状態において開放されてこの弾性リング状体（5f）の両側を連通する流路（F）を形成するものであり、後程説明するが、止水弁（2）の交換作業時に、新しい止水弁（2）が取り付けられたのち、前記閉塞具（5B）による枝管（B）の閉塞を解除するにあたって、前記一対の押圧板（5c），（5d）による挟圧力が所定以下になることで開放されて液体を弾性リング状体（5f）の上流側から下流側に通過さ

10 せ、それにより、弾性リング状体（5f）の両側部分の内部圧をほぼ等しくして弾性リング状体（5f）を自然状態にスムースに弾性復元変形させて枝管（B）の閉塞解除を支障なく行わせるためのものである。

前記固定手段（6）は、第1図（ホ）および第2図に示すように、前記止水器（5）の内端側に前記人孔フタ（B<sub>1</sub>）の大径部分に対して着脱自在な固定器（6A）を取り付けるとともに、前記第2操作軸（5b）の外端部を操作部（6a）とする固定器（6a）用の操作部（6B）を止水器（5）に組み込んで構成されている。

前記固定器（6A）は、前記第2操作軸（5b）の他端と閉塞具（5B）の第2の押圧板（5d）との間に、第2操作軸（5b）が第1操作軸（5a）に対して押圧操作具（5e）を第2の押圧板（5d）に当接させる摺動位置にあるとき、くの字形に屈折してその屈折中間部に形成の突起（6b）を前記人孔フタ（B<sub>1</sub>）の大径部分に軸芯方向から係合させるように外方に突出させ、第2操作軸（5b）が第1操作軸（5a）に対して押圧操作具（5e）を第2の押圧板（5d）から設定距離を隔てて位置させる摺動位置にあるとき、ほぼ直線状に位置して前記突起（6b）を枝管（B）の最小内径よりも内方に位置させるリンク（6c）の複数を周方向に間隔を隔てて介装することにより構成されている。

つまり、固定器（6A）は、リンク（6c）に形成の突起（6b）の人孔フタ（B<sub>1</sub>）の大径部分への係合によって、止水器（5）の止水縁（2）側への移動を阻止し、かつ、止水器（5）に作用する水圧によって止水器（5）の水道本管（A）側への移動を阻止することで、止水器（5）を、その閉塞具（5B）が人孔フタ（B<sub>1</sub>）の小径管部分（3）に位置するように固定するものである。

前記固定器（6A）用の操作具（6B）は、前記第2操作軸（5b）をもって兼用されている。

また、枝管遮閉装置は、前記操作軸（5A）のうちの第2操作軸（5b）の外端側に螺合して、第1操作軸（5a）の外端を内端側に押圧する押圧操作用のナット（7）と、前記第1操作軸（5a）の外端近くに着脱自在に外嵌する第1押え金具（8）と、前記第2操作軸（5b）の外端に着脱自在に被冠する第2押え金具（9）とを有している。

40 前記第1押え金具（8）は、第1操作軸（5a）への装着状態においてそれに付設の第1フック（8a）を前記蓋体（4）に形成の突起（4a）に係合させることにより、第1操作軸（5a）の蓋体（4）に対する外方への移動を阻止するものであって、この第1押え金具（8）の第1操作軸（5a）への固定手段は、第1操作軸（5a）に形成の周溝（10）にセットボルト（11）を係合させる手段である。

前記第2押え金具（9）は、第2操作軸（5b）への装着状態において前記第1押え金具（8）に付設の第2フック（8b）がそれに係合することにより、第2操作軸（5

b) の第1操作軸(5a)に対する外方への摺動を阻止するものである。

加えて、前記操作軸(5A)のうちの第2操作軸(5b)の外端部は、その第2操作軸(5b)を回り止めするための異径部(12)に形成されており、前記挾圧操作用のナット(7)は、止水器(5)の蓋体(4)からの内端側への抜出しを許容するように、第1操作軸(5a)の外形内に收まる大きさに形成されている。また、蓋体(4)には、栓(13)によって開閉され、開状態において蓋体

(4) 内の水を放出させる止水確認口(14)が形成され 10 ている。

次に、上記の枝管遮閉装置を用いての止水弁(2)の交換作業を例にとって、本第1発明の対枝管作業方法を工程を追って説明する。

〈1〉止水弁(2)を閉じて枝管(B)を遮断する。

〈2〉第1図(イ)に示すように、端末装置の一例である空気弁(1)を短管(B<sub>3</sub>)ごと、止水弁(2)から取り外す。

〈3〉第1図(ロ)に示すように、止水器(5)を保持した蓋体(4)を止水弁(2)に取り付けて枝管(B)の端部開口を閉塞する。この場合、止水器(5)は、予め第1、第2の押さえ金具(8), (9)および第2フック(8b)によって第2操作軸(5b)の第1操作軸(5a)に対する外方への摺動が阻止された状態にあり、固定器(6)は、縮径状態にある。

〈4〉止水弁(2)を開放する。

〈5-イ〉第1図(ハ)に示すように、操作軸(5A)のうちの第1操作軸(5a)を押圧することにより、閉塞具(5B)および固定器(6A)を止水弁(2)よりも上流の人孔フタ(B<sub>1</sub>)内まで移動させ、第1フック(8a)によってその位置に保持する。

〈5-ロ〉第1図(ニ)に示すように、第2フック(8b)を第2押さえ金具(9)から外すとともに、その第2押さえ金具(9)を第2操作軸(5b)から外し、水圧および第2操作軸(5b)を引っ張ることで、固定器(6A)のリンク(6c)を屈折させる。

〈5-ハ〉第1図(ホ)に示すように、第1フック(8a)を外して第1操作軸(5a)を引き上げ、止水器

(5)を外方側に移動させることにより、その閉塞具(5B)を人孔フタ(B<sub>1</sub>)の小径管部分(3)内に移入させると同時に、屈折したリンク(6c)の突起(6b)を人孔フタ(B<sub>1</sub>)に係合させて、止水器(5)を固定する。

〈6〉第1図(ヘ)に示すように、第2操作軸(5b)を回り止めした状態で挾圧操作用のナット(7)を螺合操作して、第1の押圧板(5c)を第2の押圧板(5d)側に押し付けて挾圧し、弹性リング状体(5f)を拡径状態に弹性変形させ、分岐口の内周壁に押圧密着させて止水する。その後、栓(13)を開いて止水確認口(14)から放水させ、その放水の止まることで止水を確認し、第1押さえ金具(8)を外す。

〈7〉第1図(ト)に示すように、止水弁(2)の人孔フタ(B<sub>1</sub>)への接続を解除し、蓋体(4)ごと止水器(5)から外方側に抜き出す。

以上が、対枝管作業のうちの前半の止水弁(2)の取外し作業であり、対枝管作業のうちの後半の止水弁(2)を交換してのちの取付け作業は、以上の操作の逆を行う作業である。すなわち、

〈8〉新しい止水弁(2)を蓋体(4)に取り付け、止水器(5)に装着し、止水弁(2)を入孔フタ(B<sub>1</sub>)に接続したのち、止水器(5)の操作軸(5A)に第1押さえ金具(8)を取り付ける。この工程が終了した状態は、第1(ヘ)へ示す状態と同じである。

〈9-イ〉閉塞具(5B)より下流側の枝管(B)の内部圧を、閉塞具(5B)よりも上流側の枝管(B)の内部圧にほぼ等しくする。具体的には、この工程は、挾圧操作用のナット(7)の螺合を若干緩めて一对の押圧板(5c), (5d)による弹性リング状体(5f)に対する挾圧力を所定以下にすることで、弹性リング状体(5f)に形成の切欠き(5x)を介して弹性リング状体(5f)の上流側から下流側に流体を通過させ、弹性リング状体(5)の下流側の枝管(B)の内部に流体を充満させることで行われる。この工程を行うことにより、閉塞具(5B)の両側の枝管(B)の内部圧の差が殆どなくなり、その差圧に起因した弹性リング状体(5f)に対する第1の押圧板(5c)および枝管(B)の内周壁側への押付力が殆どなくなるので、次の〈9-ロ〉の工程における弹性リング状体(5f)に対する挾圧力を緩める操作だけで、枝管(B)の閉塞をスムースに解除することができるようになる。

〈9-ロ〉前記〈9-イ〉の工程と同時進行的に行われるものであるが、挾圧操作用のナット(7)をさらに緩めて弹性リング状体(5f)に対するその厚さ方向への挾圧力を解除する。この工程が終了した状態は、第1図(ホ)に示す状態と同じである。

〈10-イ〉第1操作軸(5a)を押し下げ、止水器(5)を内方側に移動させることにより、屈折したリンク(6c)の突起(6b)の人孔フタ(B<sub>1</sub>)との係合を解除するとともに、閉塞具(5B)を人孔フタ(B<sub>1</sub>)の小径管部分(3)から抜け出させ、第1フック(8a)を蓋体(4)

40 に形成の突起(4a)に係合させる。この工程が終了した状態は、第1図(ニ)に示す状態と同じである。

〈10-ロ〉第2操作軸(5b)を押し下げることで、固定器(6A)のリンク(6c)を伸長させ、第2押さえ金具(9)を第2操作軸(5b)に取り付け、その第2押さえ金具(9)に第2フック(8b)を係合させる。この工程が終了した状態は、第1図(ハ)に示す状態と同じである。

〈10-ハ〉第1フック(8a)を外し、第1操作軸(5a)を引き上げ、閉塞具(5B)および固定器(6A)を止水弁 50 (2)よりも下流の蓋体(4)内に収容されるまで移動

させる。

〈11〉止水弁（2）により枝管（B）を遮断したのち（この状態は、第1図（ロ）に示す状態と同じである）、蓋体（4）の止水弁（2）への接続を解除し、止水器（5）ごと蓋体（4）を取り外す。この工程が終了した状態は、第1図（イ）に示す状態と同じである。

〈12〉端末装置である空気弁（1）を取り付けた短管（B<sub>3</sub>）を止水弁（2）に接続し、止水弁（2）を開放する。この工程が終了した状態は第3図に示す状態と同じである。なお、このとき空気弁（1）はもとのままのものであってもよいし、或いは、メンテナンス済、または、新しいものであってもよい。

以上で、対枝管作業の一例である止水弁（2）の交換作業が終了する。

#### 〔別実施例〕

以下、本発明の別の実施例を、枝管遮閉装置と対枝管作業方法とに分けてそれぞれ列記する。

##### 〈A〉枝管遮閉装置

〈A-1〉上記実施例では、固定器（6A）として、リンク（6c）の人孔フタ（B<sub>1</sub>）への係合により位置固定するものを示したが、その係合構成は適宜変更可能であり、また、固定器（6A）としては、枝管（B）内周面への突っ張りや摩擦により位置固定するものであってもよい。

〈A-2〉上記実施例では、固定器（6A）の操作具（6B）を操作軸（5A）の第2操作軸（5b）をもって兼用させたが、操作具（6B）としては、第2操作軸（5b）内を貫通するものであってもよい。

〈A-3〉上記実施例では、固定器（6A）により閉塞具（5B）の位置固定を行うものでしたが、固定器（6A）を省略した構成にしてもよい。

〈A-4〉上記実施例では、弾性リング状体（5f）の切欠き（5x）によって、弾性リング状体（5f）に対する挾圧力が所定以下のときに流路（F）を形成するものを示したが、その流路（F）を形成するための具体的構成は適宜変更自在であり、次にその数例を列記する。

〈A-4-1〉第6図に示すように、弾性リング状体（5f）の切欠き（5x）を、弾性リング状体（5f）の切欠き（5x）を、枝管（B）の内周壁に当接する部分に形成する。

〈A-4-2〉第7図に示すように、弾性リング状体（5f）の切欠き（5x）を、第1の押圧板（5c）に当接する部分から枝管（B）の内周壁に当接する部分に亘って形成する。

〈A-4-3〉第8図に示すように、弾性リング状体（5f）の切欠き（5x）を、その断面視における全周に亘って形成する。

〈A-4-4〉第9図に示すように、弾性リング状体（5f）にその上下を連通する小孔（5xx）を形成する。

〈A-4-5〉第10図に示すように、第1の押圧板（5c）に溝（5y）を形成し、弾性リング状体（5f）に対す

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る挾圧力が所定以下のときに、弾性リング状体（5f）がその溝（5y）から抜け出することで、その溝（5y）により流路（F）が形成されるように構成する。

〈A-4-6〉流路（F）を形成するための切欠き（5x）や小孔（5xx）或いは溝（5y）の数は任意であり、またその形状も適宜変更が可能である。

〈A-5〉上記実施例では、水道用の枝管（B）に介装された止水弁（2）を交換のための止水に適用したが、本第2発明の枝管遮閉装置は、各種流体用の枝管（B）に介装された弁（2）を交換するための遮閉のみならず、枝管（B）を内面構成する場合等にも適用できる。

##### 〈B〉対枝管作業方法

〈B-1〉先の実施例では、閉塞具（5B）の弾性リング状体（5f）に対する挾圧力が所定以下になることで開放され、流体を弾性リング状体（5f）の上流側から下流側へ通過させることによって閉塞具（5B）の上流側と下流側との枝管（B）の内部圧をほぼ等しくすることのできるものを示したが、〈9-イ〉の工程を実現するため、それに替えて、先に述べた〈A-4〉の各種の構成の閉塞具（5B）を用いたり、或いは、第11図に示すように、第1の押圧板（5c）にその両側を連通する小孔（5z）を形成し、弾性リング状体（5f）に対する挾圧力が所定以下になることでこの小孔（5z）を介して流体の通過を許容する構成の閉塞具（5B）を用いたりしてもよい。

〈B-2〉また、先の実施例や上記〈B-1〉に記載の方法に替えて、図示はしないが、閉塞具（5B）の上流側と下流側とを通過するバイパス流路を枝管（B）とは別に設けるとともにそのバイパス流路を開閉するコックを設け、閉塞具（5B）による枝管（B）の閉塞を解除するにあたってこのコックを開放して閉塞具（5B）の上流側から下流側に流体を通過させることでそれら両部分の内部圧をほぼ等しくすることができるようにもよい。

〈B-3〉さらに、閉塞具（5B）よりも下流側の枝管（B）の内部に本管（A）内を輸送される流体と同じ流体あるいはそれと混在しても支障のない空気等の他の流体を圧入するための流体圧入装置を設け、閉塞具（5B）により枝管（B）の閉塞を解除するにあたって、その流体圧入装置を作動させて閉塞具（5B）よりも下流側の枝管（B）の内部圧を閉塞具（5B）よりも上流側の枝管（B）の内部圧にほぼ等しくするようにもよい。なお、その流体圧入装置の作動は、手動で行うように構成してもよく、或いは、弾性リング状体（5f）に対する挾圧力の減少に連動して自動的に行われるよう構成してもよい。

〈B-4〉閉塞具（5B）よりも上流側の枝管（B）の内部圧を閉塞具（5B）よりも上流側の枝管（B）の内部圧にほぼ等しくする工程と、弾性リング状体（5f）に対するその厚さ方向への挾圧力を解除する工程とは、先の実施例で説明したように同時進行的に行ってもよく、或い

は、何れか一方を先に順次的に行ってよい。

〈B-5〉この方法に用いる枝管遮閉装置の具体的構成は適宜変更自在で、前述した〈A-1〉～〈A-3〉の変更が可能であるほか、図示はしないが、一对の押圧板(5c), (5d)の何れか一方のみが可動に構成されたものであってもよい。

〈B-6〉端末装置としては、先の実施例で説明した空気弁(1)のほか、消火栓等であってもよく、適宜変更可能である。

〈B-7〉この方法によって行われる対枝管作業として10は、先の実施例で説明した仕切弁(2)の交換作業のほか、仕切弁(2)のメンテナンス作業や、仕切弁(2)に加えて他の装置を枝管(B)に介装する作業等がある。

尚、特許請求の範囲の項に図面との対照を便利にする為に符号を記すが、該記入により本発明は添付図面の構造

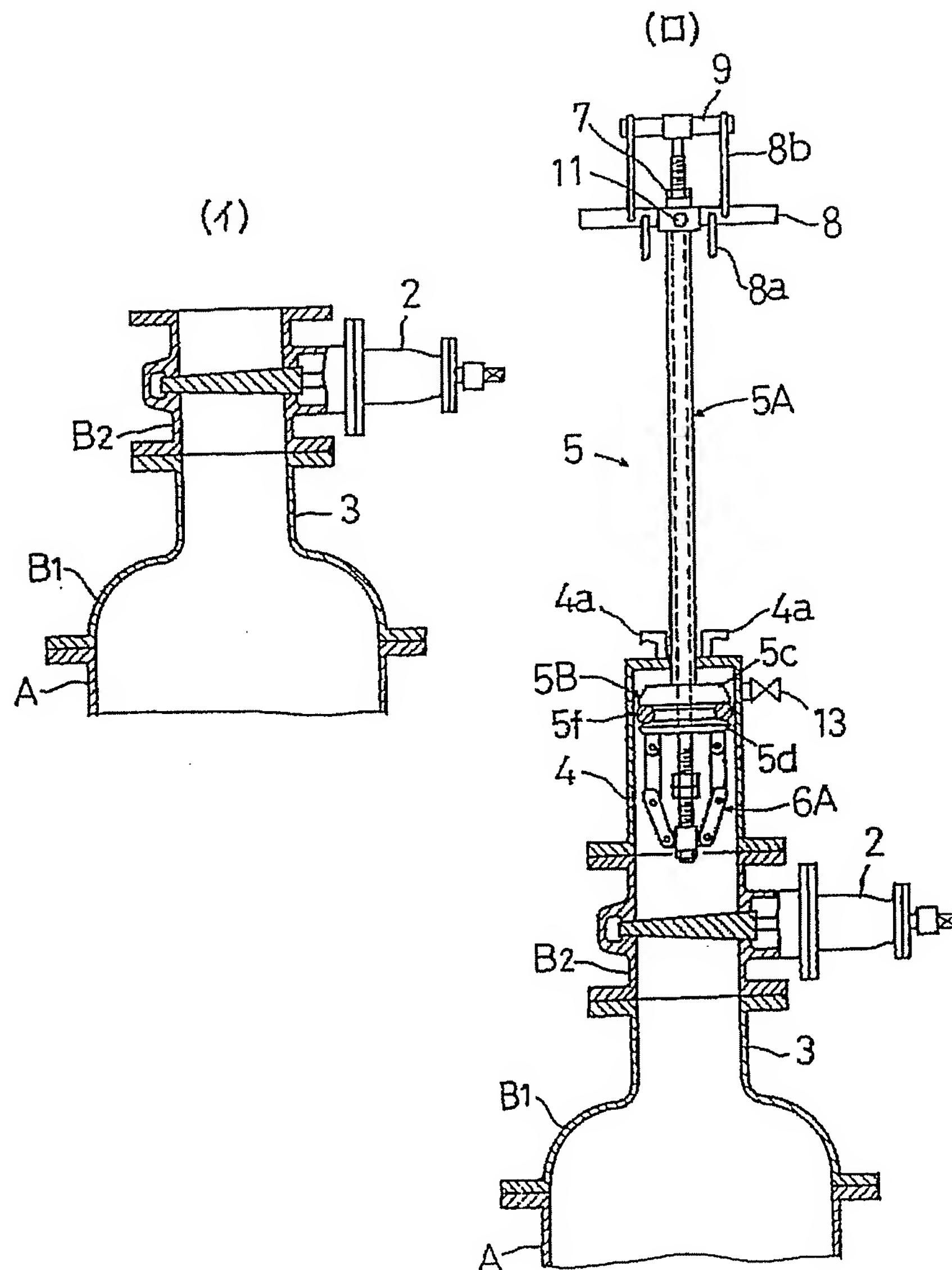
に限定されるものではない。

#### 【図面の簡単な説明】

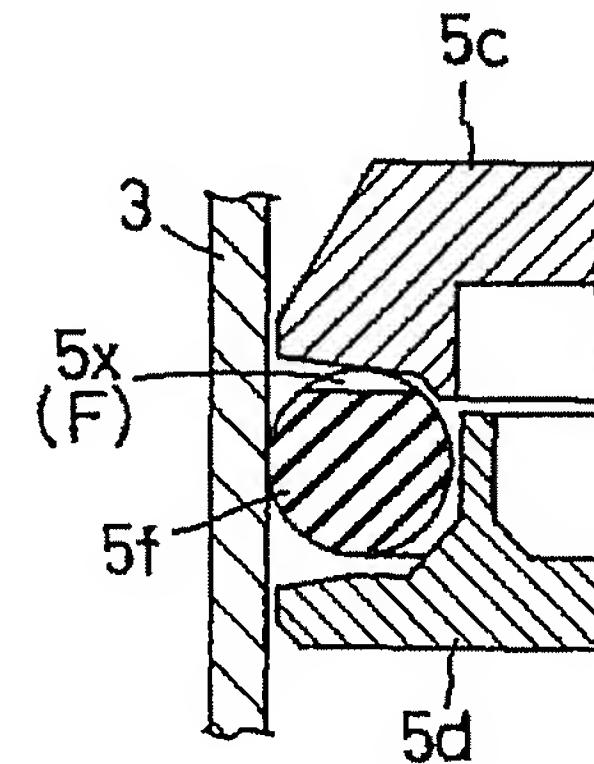
第1図ないし第5図は本発明に係る対枝管作業方法および枝管遮閉装置の実施例を示し、第1図(イ)ないし(ト)は作業工程を示す断面図、第2図は枝管遮閉装置の縦断面図、第3図は対象管の断面図、第4図は要部拡大断面図、第5図は弾性リング状体の平面図である。第6図ないし第10図は枝管遮閉装置の別の実施例を示す要部断面図、第11図は対枝管作業方法の別の実施例を示す枝管遮閉装置の要部断面図である。

(A) ……本管、(B) ……枝管、(1) ……端末装置、(2) ……仕切弁、(4) ……蓋体、(5A) ……操作軸、(5B) 閉塞具、(5a) ……第1操作軸、(5b) ……第2操作軸、(5c), (5d) ……押圧板、(5f) ……弾性リング状体、(F) ……流路。

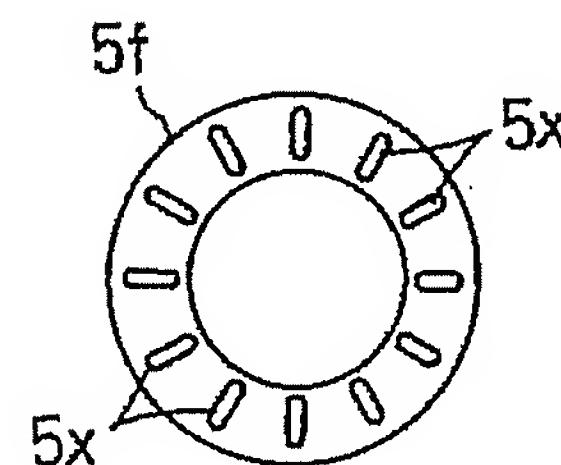
【第1図】



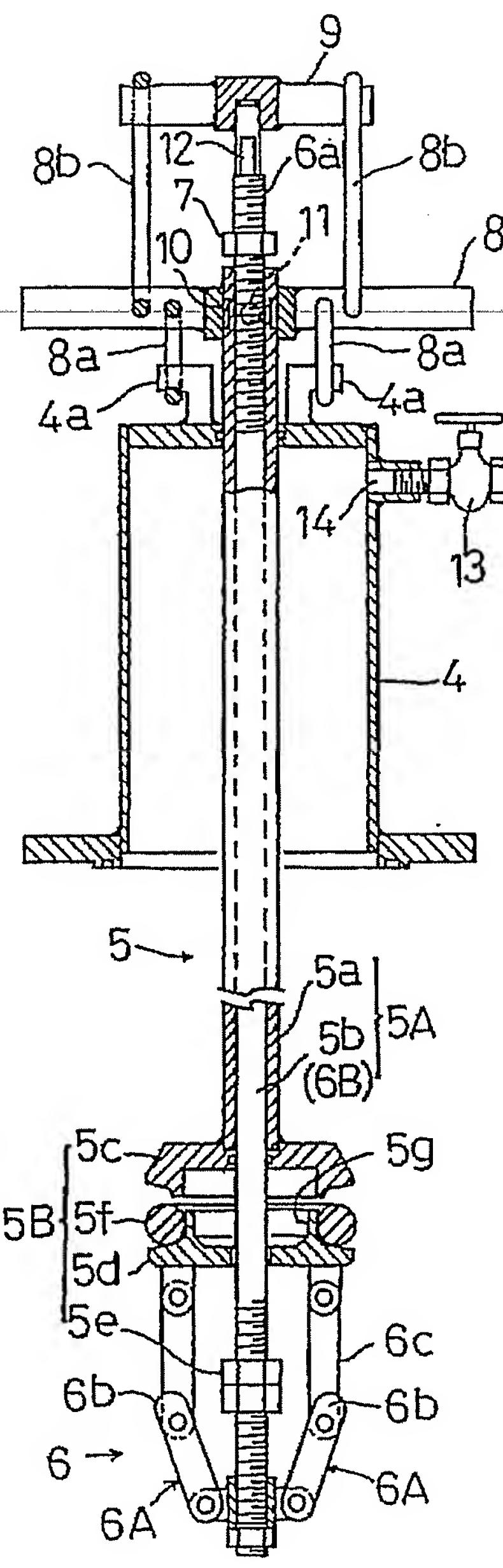
【第4図】



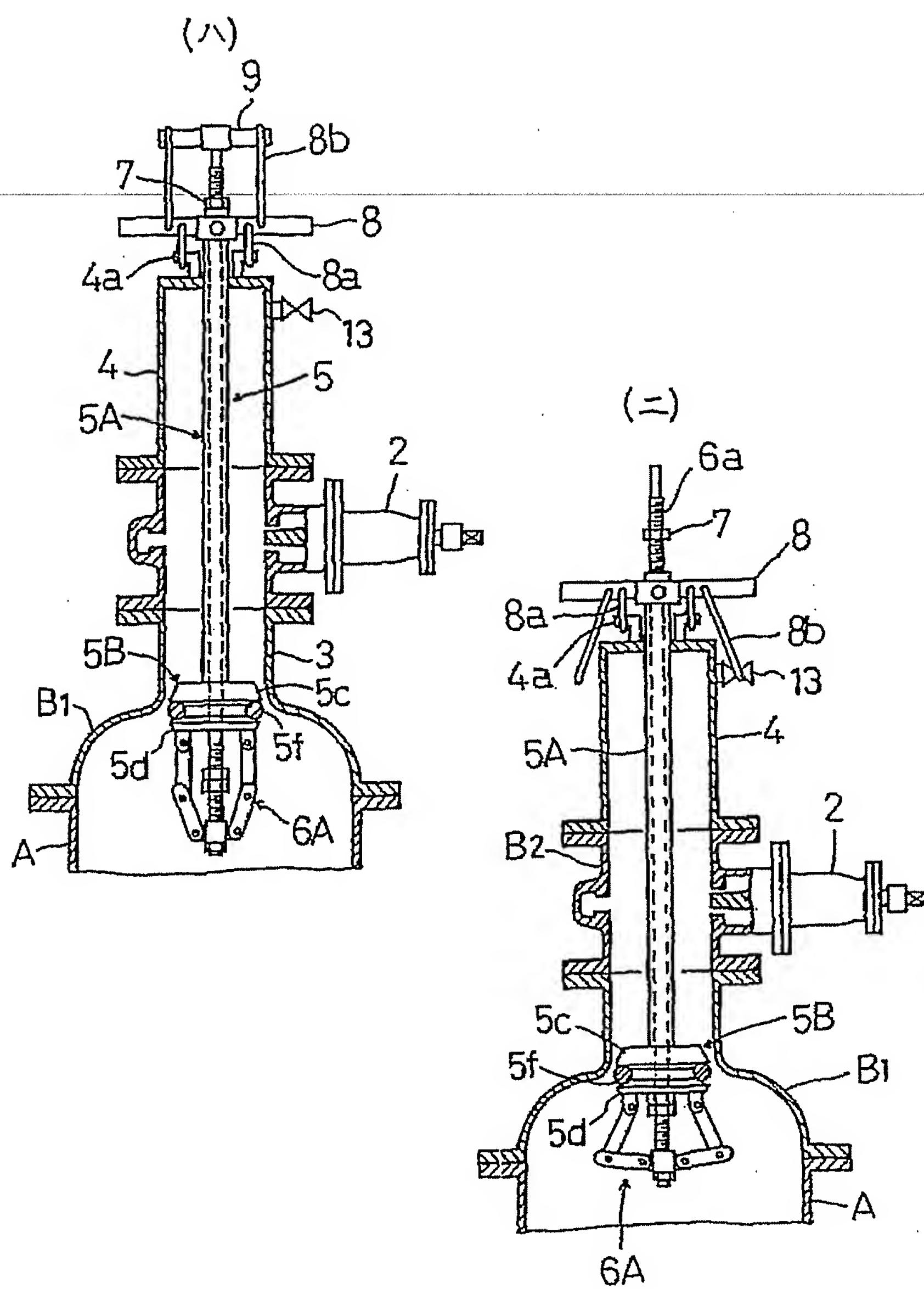
【第5図】



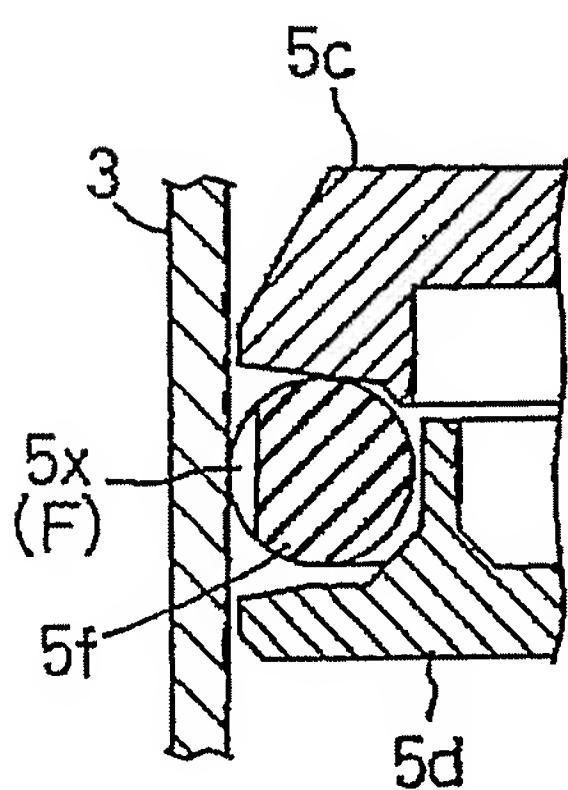
【第2図】



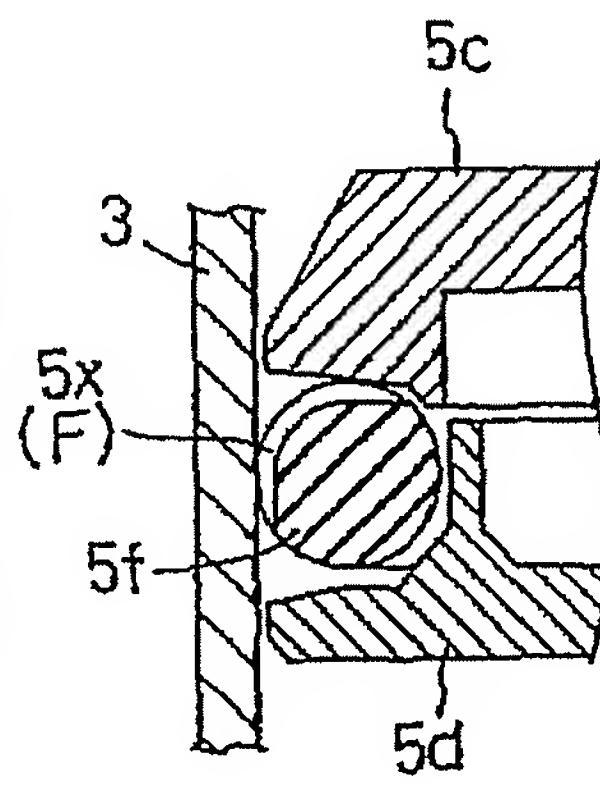
【第1図】



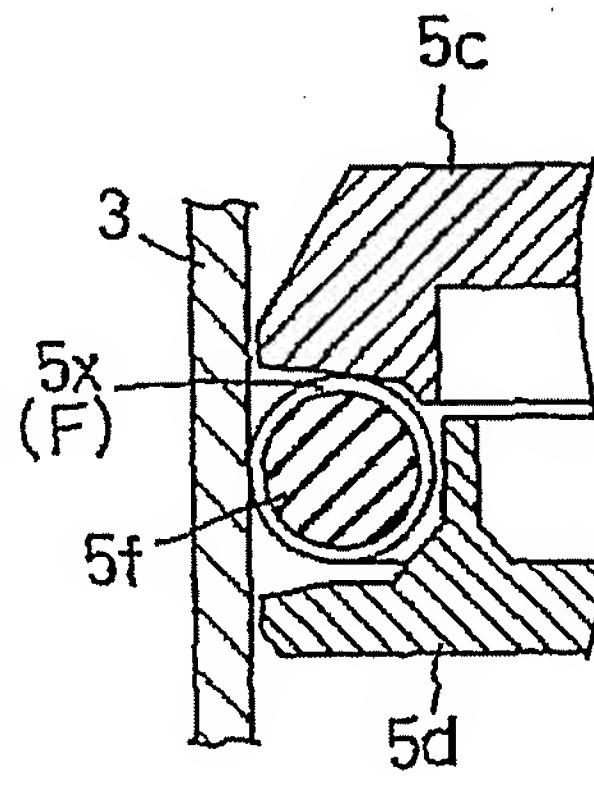
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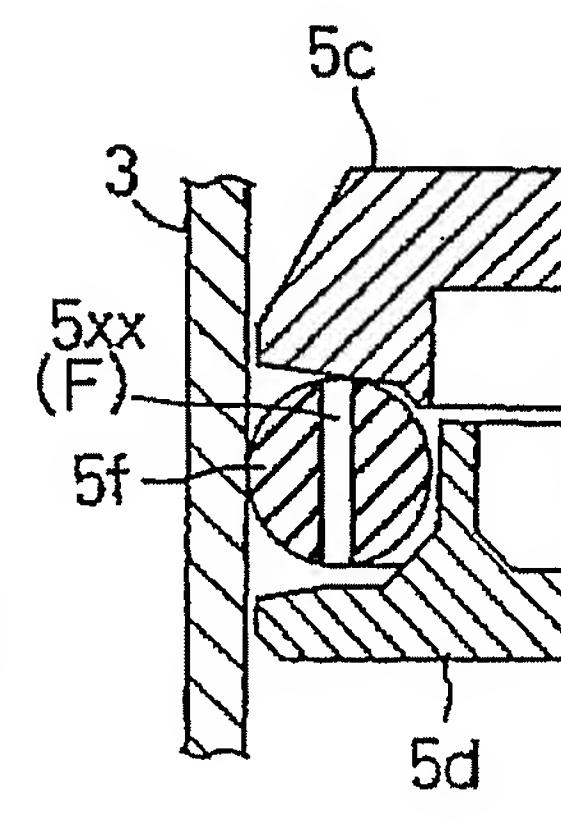
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【第8図】

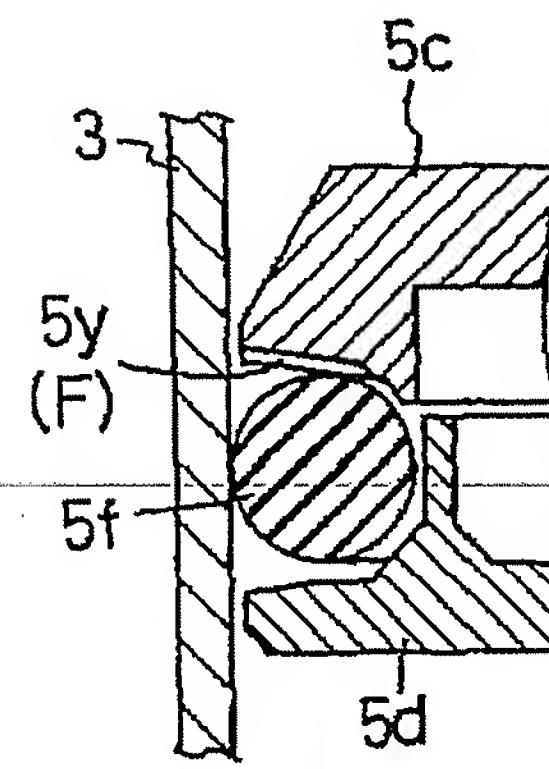
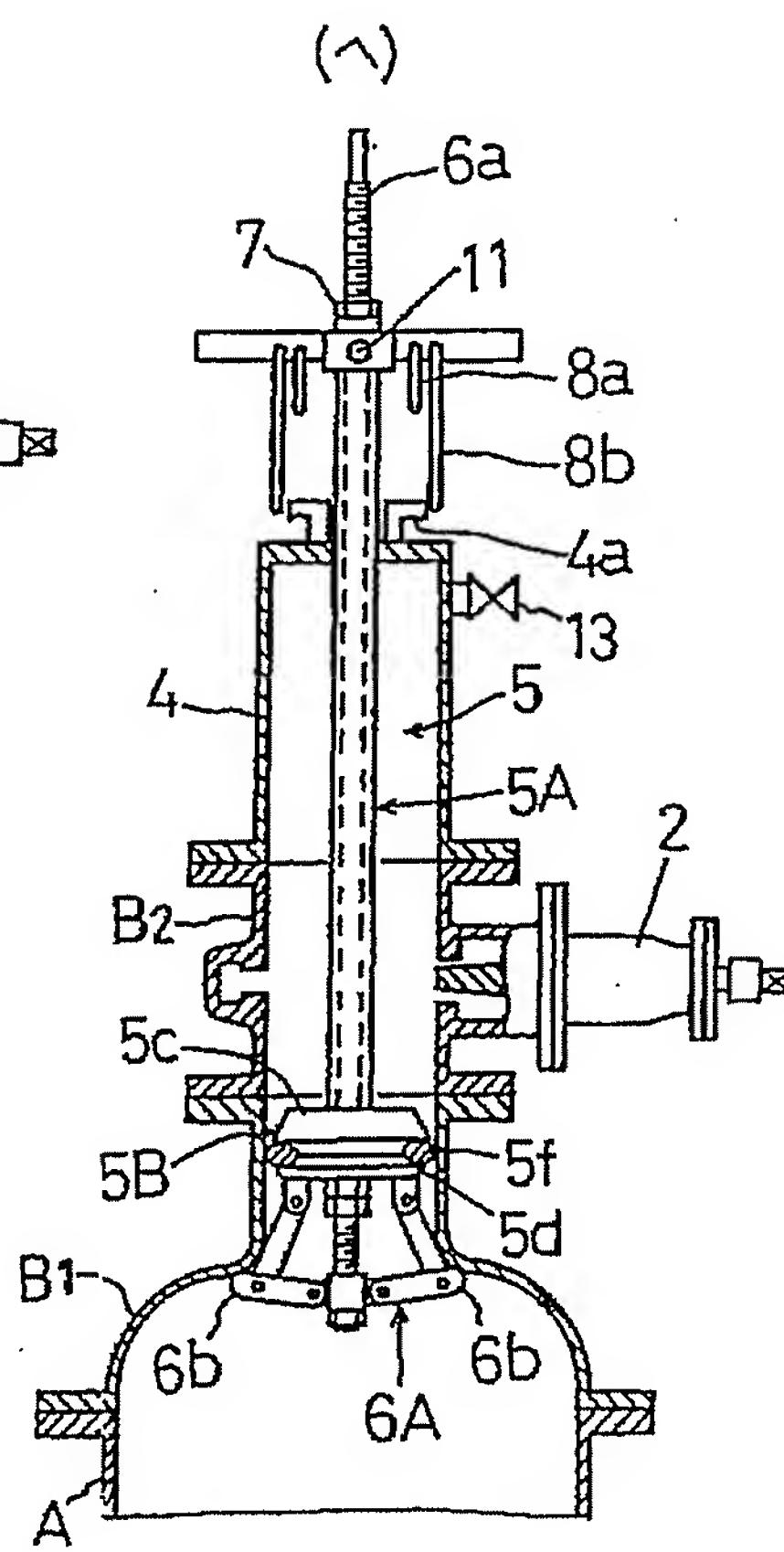
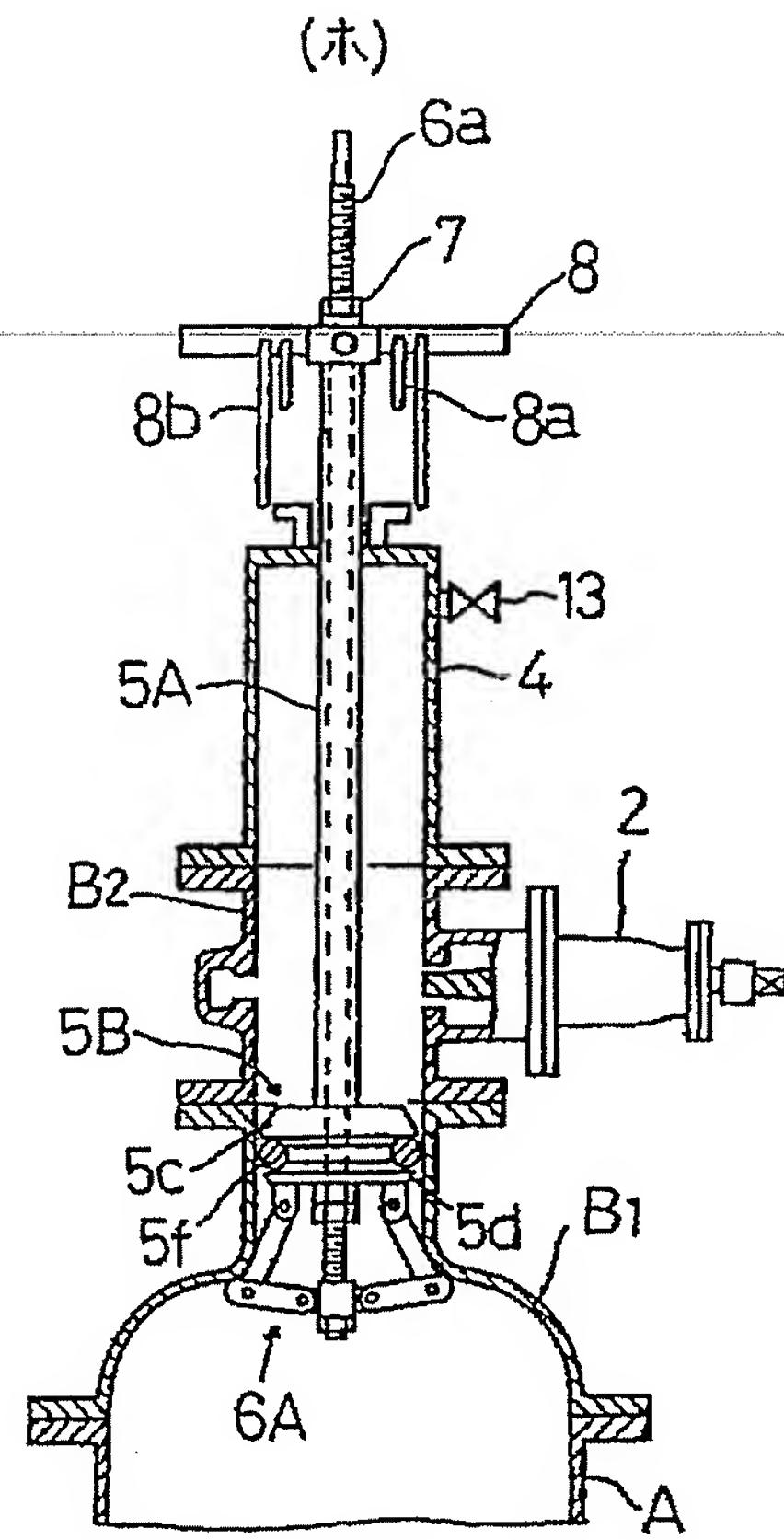


【第9図】

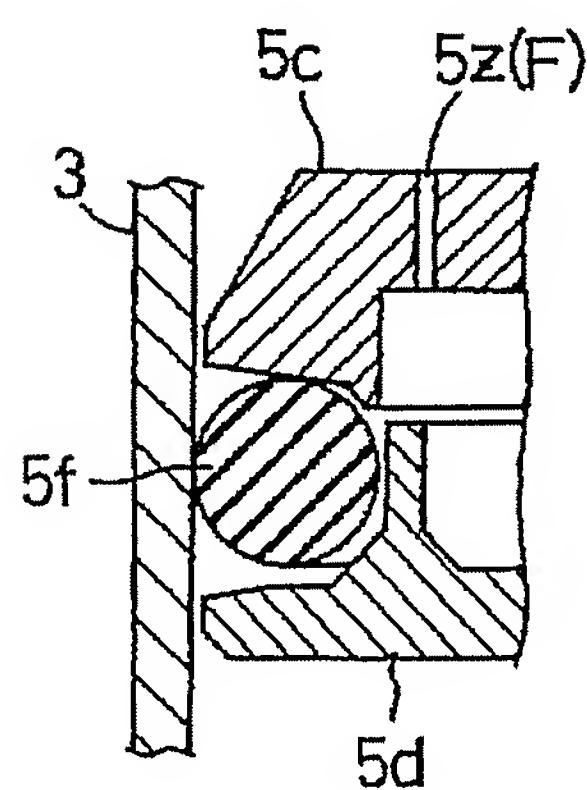


【第10図】

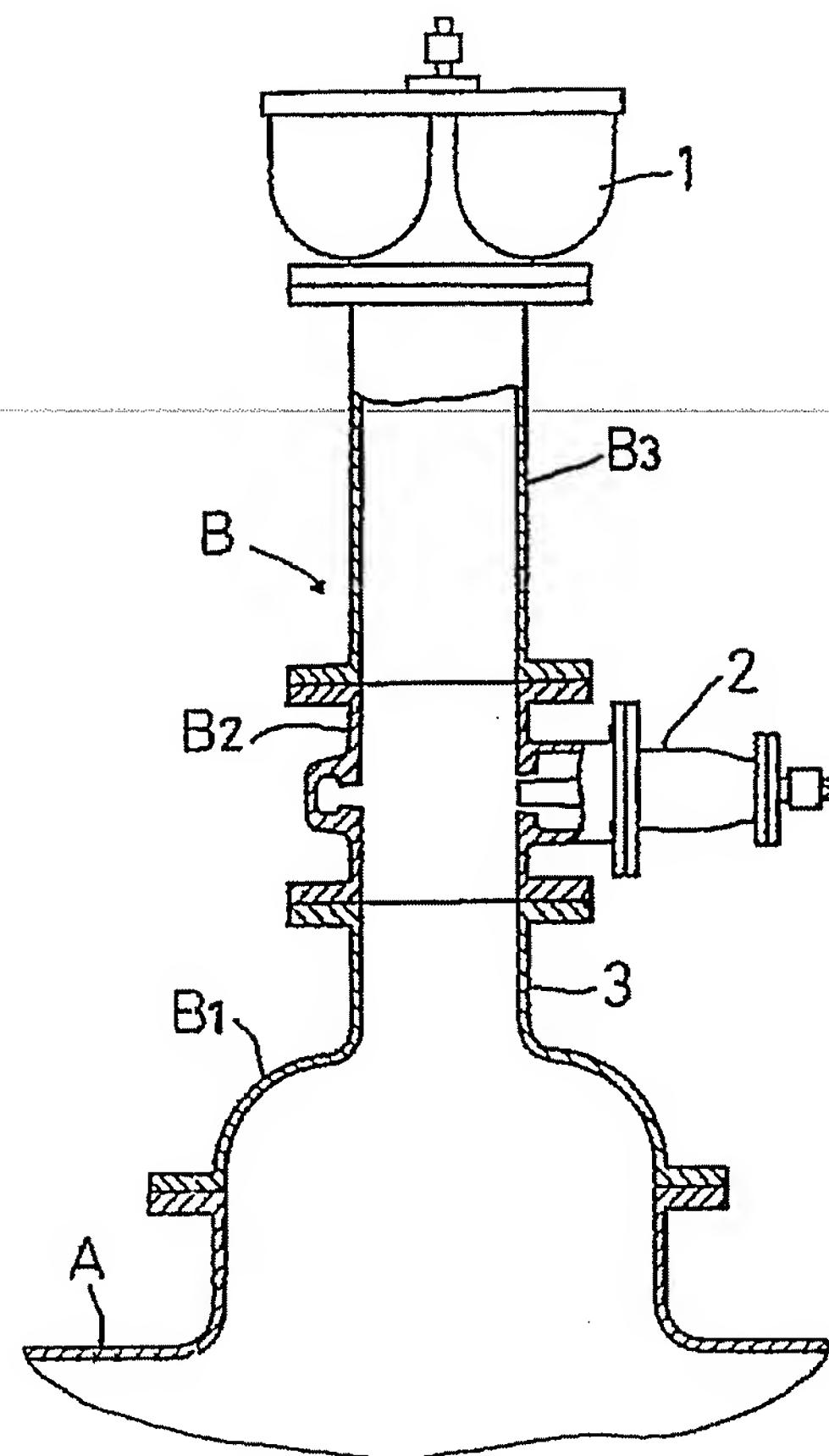
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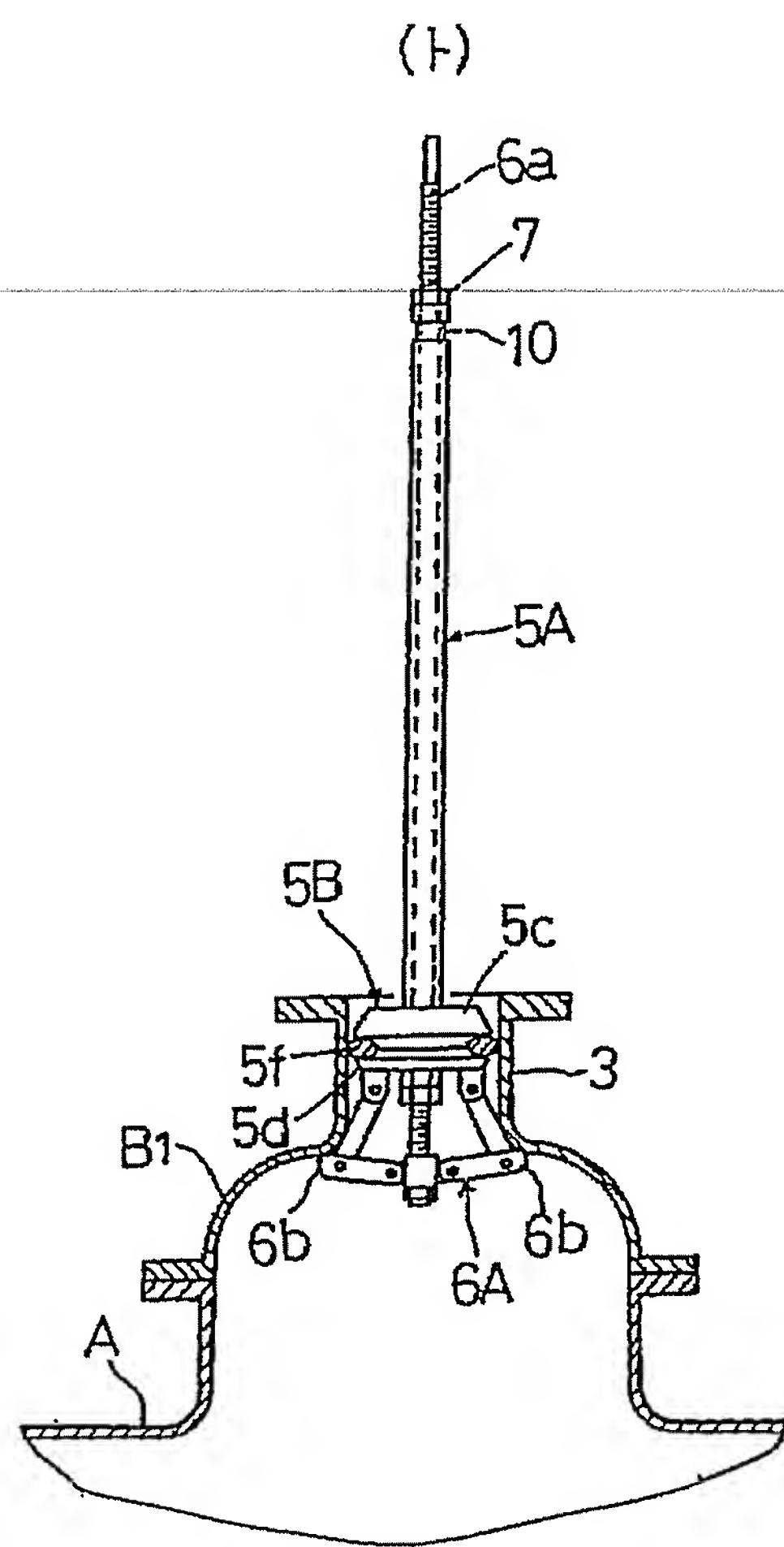
【第11図】



【第3図】



【第1図】



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**CLAIMS**

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**[Claim(s)]**

[Claim 1]\*\*1\*\* By a slice valve (2) infixes in the middle of a branch pipe (B) by which multipoint connection was carried out to a main for fluid transfers (A). A process of intercepting said branch pipe (B), a process of removing a terminal unit (1) with which an end of the <2> aforementioned branch pipe (B) was equipped, \*\*3\*\* A process of equipping an end of said branch pipe (B) with a lid (4), and blockading an end opening of the branch pipe (B), \*\*4\*\* A process of opening said slice valve (2), a process which moves obturator (5B) which carried out sliding operation of the operating shaft (5A) which penetrates the <5> aforementioned lid (4) for a shaft core direction by a sealed state enabling free sliding, and was provided in inner one end of the operating shaft (5A) even to an upstream portion from said slice valve (2), \*\*6\*\* By carrying out approach moving operation of a press plate (5c) of a couple of said obturator (5B) attached to inner one end of said operating shaft (5A), and the (5d) in a shaft core direction, The press plate (5c), a process of blockading said branch pipe (B) by carrying out elastic deformation to a diameter expanded state which compresses an elastic ring-like object (5f) infixes among (5d) from a shaft core direction, and sticks it to an inner circle wall of a branch pipe (B), \*\*7\*\* A process of attaching a new slice valve (2) finishing [ a process of removing said slice valve (2), and <8> maintenance work ], \*\*9\*\* Said press plate (5c), a process which cancel compression to an elastic ring-like object (5f) by (5d) and of which a blockade of said branch pipe (B) by obturator (5B) is canceled, \*\*10\*\* A process to which said obturator (5B) is moved until it is accommodated in said lid (4), \*\*11\*\* A process of removing said lid (4) after intercepting said branch pipe (B) by said slice valve (2), \*\*12\*\* A process of opening said slice valve (2) after equipping with a terminal unit (1), Are an opposite [ \*\* and others ] branch pipe working method, and a process of the above <9> rather than the <9-1> aforementioned obturator (5B) internal pressure of a branch pipe (B) of the downstream, A process made almost more nearly equal to internal pressure of a branch pipe (B) of the

upstream than said obturator (B) and the <9-RO> aforementioned press plate (5c), a working method for a branch pipe which is what consists of a process of which compression to an elastic ring-like object (5f) by (5d) is canceled.

[Claim 2]A lid (4) with which an end of a pipe portion which connects with a downstream end of the slice valve (2) or it so that an end opening of a branch pipe (B) with which multipoint connection was carried out to a main for fluid transfers (A), and a slice valve (2) was infix in the middle may be blockaded can be equipped, The 1st tubed operating shaft (5a) that penetrates this lid (4) for a shaft core direction by a sealed state enabling free sliding, providing the 2nd operating shaft (5b) that penetrates inside of this 1st operating shaft (5a) enabling free sliding -- inner one end of these 1st operating shafts (5a) and the 2nd operating shaft (5b) -- each, while attaching another press plate (5c) and (5d), Between a press plate (5c) of these couples, and (5d), a press plate of these couples (5c), By compression from a shaft core direction by (5d), carry out elastic deformation to a diameter expanded state stuck to an inner circle wall of said branch pipe (B), and A press plate of the inner circle wall and said couple (5c), In a branch pipe shielding device which has infix an elastic ring-like object (5f) which shields between peripheral parts of (5d), to a contact part of a thing located in a press plate (5c) of said couple, and the downstream of (the 5d), or an inner circle wall of said branch pipe (B) and said elastic ring-like object (5f). A press plate (5c) of said couple, a branch pipe shielding device which has formed a channel (F) opened so that said fluid may be passed from the upstream of said elastic ring-like object (5f) to the downstream because compression power to said elastic ring-like object (5f) by (5d) becomes below predetermined.

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[Translation done.]

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

### [Industrial Application]

This invention the slice valve for water cutoff infixing in the middle of the branch pipe for terminal units, such as a fire hydrant by which multipoint connection was carried out to the water main, and an air valve, for example, Though returning water with a water main is performed, it is related with the branch pipe shielding device used for a working method for a branch pipe of exchanging where the leakage of water from a branch pipe is prevented, and a method for the same.

By the slice valve infixing in the middle of the branch pipe by which multipoint connection was carried out to the main for <1> fluid transfers about the method in more detail. The process of intercepting said branch pipe, the process of removing the terminal unit with which the end of the <2> aforementioned branch pipe was equipped, \*\*3\*\* The process of equipping the end of said branch pipe with a lid, and blockading the end opening of the branch pipe, \*\*4\*\* The process of opening said slice valve, the process which moves the obturator which carried out sliding operation of the operating shaft which penetrates the <5> aforementioned lid for a shaft core direction by a sealed state enabling free sliding, and was provided in inner one end of the operating shaft even to an upstream section rather than said slice valve, \*\*6\*\* By carrying out approach moving operation of the press plate of a couple attached to inner one end of said operating shaft in a shaft core direction, The process of blockading said branch pipe by carrying out elastic deformation to the diameter expanded state which compresses the elastic ring state infixing between the press plate from a shaft core direction, and is stuck to the inner circle wall of a branch pipe, \*\*7\*\*. Finishing [ the process of removing said slice valve, and <8> maintenance work ] Or the process of attaching a new slice valve, the process which cancel the compression to the elastic ring-like object by the <9> aforementioned press plate and of which the blockade of said branch pipe by the obturator is canceled, \*\*10\*\* The process of

removing said lid after intercepting said branch pipe by the process and the <11> aforementioned slice valve to which said obturator is moved until it is accommodated in said lid, \*\*12\*\* After equipping with a terminal unit, it is related with the process of opening said slice valve, and an opposite [ \*\* and others ] branch pipe working method.

On the other hand, the lid with which the end of the pipe portion which connects with the downstream end of the slice valve or it so that the end opening of the branch pipe with which multipoint connection was carried out to the main for fluid transfers, and the slice valve was infix in the middle about the device may be blockaded can be equipped, providing the 1st tubed operating shaft that penetrates this lid for a shaft core direction by a sealed state enabling free sliding, and the 2nd operating shaft that penetrates the inside of this 1st operating shaft enabling free sliding -- inner one end of these 1st operating shafts and the 2nd operating shaft -- each, while attaching another press plate, It is related with the branch pipe shielding device which has infix the elastic ring-like object which carries out elastic deformation to the diameter expanded state stuck to the inner circle wall of said branch pipe by the compression from the shaft core direction by the press plate of these couples, and shields between the inner circle wall and peripheral part of the press plate of said couple between the press plates of these couples.

#### [Description of the Prior Art]

When doing the work for a branch pipe of exchange of the slice valve of infixation to the branch pipe mentioned above, etc., in the former. In the process of <9> mentioned above, after attaching a new slice valve, the blockade of the branch pipe by the obturator, He was trying to cancel by carrying out elastic restoration modification to the diameter reduced state which warms the compression power from a shaft core direction to the elastic ring-like object of the obturator, and a crevice produces between the inner circle walls of a branch pipe (literature cannot be mentioned).

#### [The problem which an invention tends to solve

However, when based on the conventional method mentioned above, there were the following problems.

That is, where a finishing maintenance or new slice valve is attached. Since it is acting to an elastic ring-like object as power in which the differential pressure of the hydrostatic pressure of the upstream and the atmospheric pressure of the downstream pushes the elastic ring-like object against the inner circle wall of a branch pipe, and the press plate of the downstream, Even if it cancels the compression to the elastic ring-like object by a press plate, an elastic ring-like object, It is held at the state of it being pushed against the press plate of the downstream, and the inner circle wall of a branch pipe by the aforementioned differential pressure, and sticking by it, and when unblocking of a branch pipe is no longer performed smoothly and especially the fluid is conveyed with high voltage in a main, remarkable working

efficiency causes a fall.

The purpose of the 1st invention is to provide conventionally the working method for a branch pipe which can perform unblocking of a branch pipe smoothly in view of the actual condition, and the purpose of the 2nd invention has it in providing a useful branch pipe shielding device for using for such a working method for a branch pipe.

#### [Means for Solving the Problem]

. Finishing [ the feature of a working method for a branch pipe by the 1st invention / a maintenance ] Or a process of which a blockade of a branch pipe by obturator is canceled after attaching a new slice valve, \*\*\*\*\* a process of making internal pressure of a branch pipe of the downstream almost more nearly equal to internal pressure of a branch pipe of the upstream rather than obturator than said obturator, and \*\*\*\*\* -- be in consisting of a process of which compression to an elastic ring-like object by said press plate is canceled.

#### [Function]

That is, since the internal pressure of the upstream of the obturator and the downstream becomes [ according to the working method for a branch pipe of the 1st invention ] almost the same in canceling the blockade of a branch pipe, when the compression to the elastic ring-like object by a press plate is canceled, The power resulting from the differential pressure of the internal pressure of the branch pipe which will push an elastic ring-like object against the press plate of the downstream to it and the inner circle wall of a branch pipe is almost lost, and an elastic ring-like object carries out elastic restoration modification easily at the diameter reduced state which a crevice produces between the inner circle walls of a branch pipe.

#### [Effect of the Invention]

As a result, even if it was in the situation of conveying a fluid with high voltage in a main even if, unblocking of a branch pipe can be smoothly performed by canceling the compression to an elastic ring-like object, and the efficiency of the work for a branch pipe of a maintenance and exchange of a slice valve could be raised.

#### [Means for Solving the Problem]

The feature composition of a branch pipe shielding device by the 2nd invention, To a contact part of a thing located in the downstream of the press plates of a couple for carrying out elastic deformation to a diameter expanded state which sticks an elastic ring-like object to an inner circle wall of a branch pipe by compression from a shaft core direction, or an inner circle wall of a branch pipe and said elastic ring-like object. It is in having formed a channel opened so that a fluid may be passed from the upstream of said elastic ring-like object to the downstream because compression power to said elastic ring-like object by a press plate of said couple becomes below predetermined.

#### [Function]

That is, if the branch pipe shielding device of the 2nd invention is used, since a channel will be

opened because the compression power to the elastic ring-like object by the press plate of a couple becomes below predetermined and a fluid will pass from the upstream of an elastic ring-like object to the downstream, the diameter reduced state which the internal pressure of the branch pipe in the both sides of an elastic ring-like object becomes almost the same, and a crevice produces between the inner circle walls of a branch pipe in an elastic ring-like object -- an obstacle -- elastic restoration modification is carried out few.

And isotonic-ization with the upstream of the elastic ring-like object for making the blockade of the branch pipe mentioned above cancel smoothly and the downstream, Since it has come to be able to do by establishing a channel in the contact part of the thing located in the downstream of the press plates of the couple with which this kind of device is equipped essentially, or the inner circle wall of a branch pipe and an elastic ring-like object, What is necessary is just to add some reconstruction to these component parts, and, moreover, it can carry out only by warming the compression power to an elastic ring-like object.

#### [Effect of the Invention]

. As a result, finishing [ in performing a maintenance, exchange, etc. to the slice valve etc. which were infixed in the branch pipe / maintenance work ] by using the branch pipe shielding device by the 2nd invention Or since release of a blockade of the branch pipe after attaching a new slice valve etc. can be smoothly performed by making internal pressure of the both sides of an elastic ring-like object almost the same, the working efficiency can be raised. And since the composition for it can be obtained by reconstruction of some of the parts which this kind of device has essentially, For example, installation of the large-scale device of providing the valve for opening and closing the bypass passage and it which open the both sides of an elastic ring-like object for free passage, etc. can be made unnecessary, it is advantageous in cost and the increase of work space can be avoided. Since the special operation for making internal pressure of the both sides of an elastic ring-like object almost the same in addition to operation of warming the compression power to an elastic ring-like object for unblocking of a branch pipe is not needed, it is the same operation feeling as the former, and can work without fear of an operation failure.

Therefore, what was excellent also in any of operation sides and a cost aspect as a branch pipe shielding device used when doing the work for a branch pipe as a whole, continuing a fluid transfer has been provided.

#### [Example]

Hereafter, the example of this invention is described based on a drawing.

First, in advance of explanation of the working method for a branch pipe by the 1st invention, the branch pipe shielding device by the 2nd invention used for it is explained.

As shown in Drawing 3, while multipoint connection of this branch pipe shielding device is carried out to the water main (A) of burial to underground and it connects an air valve (1) to

that end, In the case where said stop valve (2) of the branch pipe (B) which infixed the stop valve (2) which is an example of a slice valve in the middle is exchanged, Among said branch pipes (B), it is a device for cutting off water in the state of permitting exchange of said stop valve (2), and the pipe portion (3) of the upstream of a stop valve (2) consists of a water cutoff machine (5) and a fixing means (6).

The manhole lid (B<sub>1</sub>) which carries out the flange connection of said branch pipe (B) to the pipe tee with a flange of a water main (A) in the large caliber part by the side of an end, It comprises a valve box (B<sub>2</sub>) of said stop valve (2) which carries out a flange connection to the small caliber end of this manhole lid (B<sub>1</sub>) at the end side, and a short pipe for air valve attachment (B<sub>3</sub>) which carries out a flange connection to the other end of this valve box (B<sub>2</sub>). The upstream pipe portion (3) used as the candidate for water cutoff is a byway pipe portion of said manhole lid (B<sub>1</sub>).

As shown in 1st [ \*\* ] figure (\*\*) and Drawing 2, a flange connection is possible for said lid (4) to the other end of the stop valve (2) so that the other end opening by which the short pipe (B<sub>3</sub>) of said stop valve (2) was removed may be blockaded, and it is a thing of the vessel shape in which an inner package is possible about said water cutoff machine (5).

Said water cutoff machine (5) comprises the operating shaft (5A) which penetrates the axis part of said lid (4) for a shaft core direction by a watertight state enabling free sliding, and the obturator (5B) attached to inner one end of this operating shaft (5A), as shown in 1st [ \*\* ] figure (\*\*) and Drawing 2.

Said operating shaft (5A) comprises the 2nd operating shaft (5b) that penetrates the inside of the 1st tubed operating shaft (5a) and this 1st operating shaft (5a) to a watertight state.

The 1st press plate (5c) that said obturator (5B) attached to the inner end of the 1st operating shaft (5a) of said operating shafts (5A), It is attached to inner one end rather than the 2nd press plate (5d) made to attach outside the toe of the 2nd operating shaft (5b) of said operating shafts (5A), enabling a free slide, By shaft core direction sliding by the side of the outer edge to the 1st operating shaft (5a) of said 2nd operating shaft (5b). The pressing operation implement (5e) which makes the 1st press plate (5a) carry out approach movement of said 2nd press plate (5d), It is compressed from a shaft core direction at both press plates (5c) and (5d) with approach movement of said 2nd press plate (5d), and both blocking plates (5c) and the elastic ring-like object (5f) which carries out diameter expansion deformation elastically so that the crevice between the peripheral part of (5d) and the inner circle wall of an upstream pipe portion (3) may be blockaded are comprised.

And said both press plates (5c) and (5d), It is formed in the byway rather than the minimum

inside diameter of the branch pipe (B) so that the inside of a branch pipe (B) can be moved to a shaft core direction, and it is formed so that an elastic ring-like object (5f) may become a byway rather than the minimum inside diameter of said branch pipe (B) similarly in the natural state of which compression was canceled. The projection (5g) for the prevention from omission which carries out an engagement hold to an elastic ring-like object (5f) is formed in the 2nd press plate (5d).

As shown in said elastic ring-like object (5f) in Drawings 4 and 5, two or more notches (5x) are formed in the 1st press plate (5c) side along the hoop direction. This notch (5x) is closed by the elastic deformation of an elastic ring-like object (5f) in the state of compression, and forms the channel (F) which compression power is wide opened in the state below predetermined, and opens the both sides of this elastic ring-like object (5f) for free passage.

Although it will explain later, After a new stop valve (2) was attached at the time of the clearing work of a stop valve (2), In canceling the blockade of the branch pipe (B) by said obturator (5B), From the upstream of an elastic ring-like object (5f), are wide opened because the press plate (5c) of said couple and the compression power by (5d) become below predetermined, pass the downstream, and a fluid by that cause, It is for making almost equal internal pressure of the both-sides portion of an elastic ring-like object (5f), carrying out elastic restoration modification of the elastic ring-like object (5f) smoothly to a natural state, and making unblocking of a branch pipe (B) perform convenient.

As said fixing means (6) is shown in 1st [ \*\* ] figure (\*\*) and Drawing 2, while attaching to inner one end of said water cutoff machine (5) the braces (6A) which can be detached and attached freely to the major-diameter portion of said manhole lid (B<sub>1</sub>), the braces (6a) which use the

heel of said 2nd operating shaft (5b) as a final controlling element (6a) -- the final controlling element (6B) of business is included in a water cutoff machine (5), and it is constituted.

Said braces (6A) between the other end of said 2nd operating shaft (5b), and the 2nd press plate (5d) of the obturator (5B), When the 2nd operating shaft (5b) is in the sliding position which makes a pressing operation implement (5e) contact the 2nd press plate (5d) to the 1st operating shaft (5a), It is refracted to the type of \*\* and the method of outside is made to project so that the projection (6b) of formation to the refraction pars intermedia may be made to engage with the major-diameter portion of said manhole lid (B<sub>1</sub>) from a shaft core direction,

When the 2nd operating shaft (5b) is in the sliding position which separates set distance from the 2nd press plate (5d) and in which a pressing operation implement (5e) is located to the 1st operating shaft (5a), It is constituted by separating an interval to a hoop direction and infixing in it the plurality of a link (6c) which is mostly located in linear shape and locates said projection (6b) in an inner direction rather than the minimum inside diameter of a branch pipe (B).

That is, braces (6A) to a link (6c) by engagement to the major-diameter portion of the manhole

lid ( $B_1$ ) of a projection (6b) of formation. By preventing movement by the side of the water main (A) of a water cutoff machine (5) with the water pressure which prevents movement by the side of the water cutoff edge (2) of a water cutoff machine (5), and acts on a water cutoff machine (5). A water cutoff machine (5) is fixed so that the obturator (5B) may be located in the byway pipe portion (3) of a manhole lid ( $B_1$ ).

said braces (6A) -- the operating tool (6B) of business has said 2nd operating shaft (5b), and is made to serve a double purpose.

A branch pipe shielding device is screwed in the outer edge side of the 2nd operating shaft (5b) of said operating shafts (5A), It has the 1st presser-foot implement (8) attached outside the nut for compression operation (7) which presses the outer edge of the 1st operating shaft (5a) on inner one end, and near the outer edge of said 1st operating shaft (5a) enabling free attachment and detachment, and the 2nd presser-foot implement (9) make free the crown of the attachment and detachment of to the outer edge of said 2nd operating shaft (5b).

Said 1st presser-foot implement (8) by making the 1st hook (8a) of the attachment to it engage with the projection (4a) of formation to said lid (4) in the mounting state to the 1st operating shaft (5a), Preventing movement to the method of the outside which receives the lid (4) of the 1st operating shaft (5a), the fixing means to the 1st operating shaft (5a) of this 1st presser-foot implement (8) is a means to make set bolts (11) engage with the circumferential groove (10) of formation to the 1st operating shaft (5a).

Said 2nd presser-foot implement (9) prevents sliding to the method of the outside which receives the 1st operating shaft (5a) of the 2nd operating shaft (5b), when the 2nd hook (8b) of the attachment to said 1st presser-foot implement (8) engages with it in the mounting state to the 2nd operating shaft (5b).

In addition, the heel of the 2nd operating shaft (5b) of said operating shafts (5A) is formed in the different diameter part (12) for carrying out the baffle of the 2nd operating shaft (5b).

The nut for said compression operation (7) is formed in the size settled in the outside of the 1st operating shaft (5a) so that the extract to inner one end from the lid (4) of a water cutoff machine (5) may be permitted.

It is opened and closed by the lid (4) with a plug (13), and the water cutoff check mouth (14) to which the water in a lid (4) is made to emit in an opened state is formed in it.

Next, the clearing work of the stop valve using an above branch pipe shielding device (2) is taken for an example, and a process is explained for the working method for a branch pipe of the 1st invention later on.

\*\*1\*\* Close a stop valve (2) and intercept a branch pipe (B).

\*\*2\*\* As shown in 1st [ \*\* ] figure (\*\*), remove the air valve (1) which is an example of a terminal unit from every short pipe ( $B_3$ ) and a stop valve (2).

\*\*3\*\* As shown in 1st [ \*\* ] figure (\*\*), attach the lid (4) holding a water cutoff machine (5) to a stop valve (2), and blockade the end opening of a branch pipe (B). In this case, a water cutoff machine (5) is in the state where sliding to the method of the outside which receives the 1st operating shaft (5a) of the 2nd operating shaft (5b) beforehand by the 1st, the 2nd presser-foot implement (8), (9), and the 2nd hook (8b) was prevented, and braces (6) are in a diameter reduced state.

\*\*4\*\* Open a stop valve (2).

\*\*5-\*\*\*\* As shown in 1st [ \*\* ] figure (\*\*), by pressing the 1st operating shaft (5a) of the operating shafts (5A), make obturator (5B) \*\* move braces (6A) into an upstream manhole lid (B<sub>1</sub>) from a stop valve (2), and hold in the position by the 1st hook (8a).

\*\*5-\*\*\*\* As shown in 1st [ \*\* ] figure (\*\*), while removing the 2nd hook (8b) from the 2nd presser-foot implement (9), remove the 2nd presser-foot implement (9) from the 2nd operating shaft (5b), and make the link (6c) of braces (6A) refracted by pulling water pressure and the 2nd operating shaft (5b).

\*\*5-\*\*\*\* By removing the 1st hook (8a), pulling up the 1st operating shaft (5a), and moving a water cutoff machine (5) to the method side of outside, as shown in 1st [ \*\* ] figure (\*\*), The projection (6b) of the refracted link (6c) is made to engage with an ON hole lid (B<sub>1</sub>), and a water cutoff machine (5) is fixed at the same time it makes the obturator (5B) of that introduce in the byway pipe portion (3) of a manhole lid (B<sub>1</sub>).

\*\*6\*\* As shown in 1st [ \*\* ] figure (\*\*), where the baffle of the 2nd operating shaft (5b) is carried out, screwing operation of the nut for compression operation (7) is carried out, Push the 1st press plate (5c) against the 2nd press plate (5d) side, compress it, carry out elastic deformation of the elastic ring-like object (5f) to a diameter expanded state, the inner circle wall of a branch opening is made to carry out press adhesion, and water is cut off. Then, open a plug (13), water is made to drain off from a water cutoff check mouth (14), and water cutoff is checked because the tail water stops, and the 1st presser-foot implement (8) is removed.

\*\*7\*\* As shown in 1st [ \*\* ] figure (\*\*), cancel connection with the manhole lid (B<sub>1</sub>) of a stop valve (2), and extract from a lid (4) every water cutoff machine (5) to the method side of outside.

The above is the removing operation of the stop valve (2) of the first half of the work for a branch pipe, the stop valve (2) of the second half of the work for a branch pipe is exchanged, and next mounting work is work which performs the reverse of the above operation. <8> -- a new stop valve (2) is attached to a lid (4), and after equipping a water cutoff machine (5) and connecting a stop valve (2) to an ON hole lid (B<sub>1</sub>), the 1st presser-foot implement (8) is attached to the operating shaft (5A) of a water cutoff machine (5). [ namely, ] The state where this process was completed is the same as the state which shows to 1st (\*\*).

\*\*9-\*\*\*\* Make internal pressure of the branch pipe (B) of the downstream almost more nearly equal to the internal pressure of the branch pipe (B) of the upstream from the obturator (5B) than the obturator (5B). This process is specifically loosening screwing of the nut for compression operation (7) a little, and making below predetermined compression power to the press plate (5c) of a couple, and the elastic ring-like object (5f) by (5d), It is carried out by making the downstream pass a fluid on an elastic ring-like object (5f) from the upstream of an elastic ring-like object (5f) via the notch (5x) of formation, and making the inside of the branch pipe (B) of the downstream of an elastic ring-like object (5) full [ object ] of a fluid. By performing this process, the difference of the internal pressure of the branch pipe (B) of the both sides of the obturator (5B) is almost lost, Since the pressing force by the side of the inner circle wall of the 1st press plate (5c) and branch pipe (B) to the elastic ring-like object (5f) resulting from the differential pressure is almost lost, Only by the operation which loosens the compression power to the elastic ring-like object (5f) in the process of following <9-RO>, the blockade of a branch pipe (B) can be smoothly canceled now.

\*\*9-\*\*\*\* Although carried out in synchronization with the process of the above <9-I>, loosen the nut for compression operation (7) further, and cancel the compression power to the thickness direction to an elastic ring-like object (5f). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (\*\*).

\*\*10-\*\*\*\* While canceling engagement on the manhole lid (B<sub>1</sub>) of a projection (6b) of the link (6c) refracted by depressing the 1st operating shaft (5a) and moving a water cutoff machine (5) to the inner direction side, The obturator (5B) is made to slip out of the byway pipe portion (3) of a manhole lid (B<sub>1</sub>), and the 1st hook (8a) is made to engage with the projection (4a) of formation to a lid (4). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (\*\*).

\*\*10-\*\*\*\* Expand the link (6c) of braces (6A), attach the 2nd presser-foot implement (9) to the 2nd operating shaft (5b), and make the 2nd hook (8b) engage with the 2nd presser-foot implement (9) by depressing the 2nd operating shaft (5b). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (\*\*).

\*\*10-\*\*\*\* Remove the 1st hook (8a), pull up the 1st operating shaft (5a), and move the obturator (5B) and braces (6A) until it is accommodated in a downstream lid (4) from a stop valve (2).

\*\*11\*\* Cancel connection with the stop valve (2) of a lid (4), and remove a water cutoff machine (5) every lid (4), after intercepting a branch pipe (B) by a stop valve (2) (this state is the same as the state which shows in 1st [ \*\* ] figure (\*\*)). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (b).

\*\*12\*\* Connect to a stop valve (2) the short pipe (B<sub>3</sub>) which attached the air valve (1) which is

a terminal unit, and open a stop valve (2). The state where this process was completed is the same as the state which shows in Drawing 3. At this time, it may be the same, or or an air valve (1) may be new. [ a maintenance ]

Above, the clearing work of the stop valve (2) which is an example of the work for a branch pipe is completed.

[Other Example(s)]

Hereafter, another example of this invention is divided into a branch pipe shielding device and the working method for a branch pipe, and is listed, respectively.

\*\*A\*\* Although the branch pipe shielding device <A-1> above-mentioned example showed what carries out position immobilization by engagement to the manhole lid (B<sub>1</sub>) of a link (6c) as braces (6A), The engagement composition can be changed suitably and position immobilization may be carried out by the prop to branch pipe (B) inner skin, or friction as braces (6A).

\*\*A-2\*\* In the above-mentioned example, although the operating tool (6B) of braces (6A) was made to make it serve a double purpose with the 2nd operating shaft (5b) of an operating shaft (5A), as an operating tool (6B), the inside of the 2nd operating shaft (5b) may be penetrated.

\*\*A-3\*\* Although what performs position immobilization of the obturator (5B) by braces (6A) was carried out in the above-mentioned example, it may have composition which omitted braces (6A).

\*\*A-4\*\* In the above-mentioned example, by the notch (5x) of the elastic ring-like object (5f), when the compression power to an elastic ring-like object (5f) was below predetermined, what forms a channel (F) was shown, but. The concrete composition for forming the channel (F) can be changed freely suitably, and then lists several of the examples.

\*\*A-4-1\*\* As shown in Drawing 6, form the notch (5x) of an elastic ring-like object (5f) in the portion which contacts the inner circle wall of a branch pipe (B) in the notch (5x) of an elastic ring-like object (5f).

\*\*A-4-2\*\* As shown in Drawing 7, continue and form the notch (5x) of an elastic ring-like object (5f) in the portion which contacts the inner circle wall of a branch pipe (B) from the portion which contacts the 1st press plate (5c).

\*\*A-4-3\*\* As shown in Drawing 8, continue and form the notch (5x) of an elastic ring-like object (5f) in the perimeter in the cross sectional view.

\*\*A-4-4\*\* As shown in Drawing 9, form the stoma (5xx) which opens the upper and lower sides for free passage on an elastic ring-like object (5f).

\*\*A-4-5\*\* As shown in Drawing 10, form a slot (5y) in the 1st press plate (5c), and when the compression power to an elastic ring-like object (5f) is below predetermined, because an elastic ring-like object (5f) slips out from the slot (5y). It constitutes so that a channel (F) may be formed of the slot (5y).

\*\*A-4-6\*\* The notch (5x) for forming a channel (F) and the number of a stoma (5xx) or slots (5y) are arbitrary, and can also change the shape suitably.

\*\*A-5\*\* Although the stop valve (2) infixes in the branch pipe for waterworks (B) was applied to the water cutoff for exchange in the above-mentioned example, the branch pipe shielding device of the 2nd invention can be applied when carrying out inner surface composition not only of shielding for exchanging the valve (2) infixes in the branch pipe for various fluids (B) but the branch pipe (B).

\*\*B\*\* In the example of the working method <B-1> point for a branch pipe. It is wide opened because the compression power to the elastic ring-like object (5f) of the obturator (5B) becomes below predetermined, Although what can make almost equal internal pressure of the branch pipe (B) of the upstream of the obturator (5B) and the downstream by passing a fluid from the upstream of an elastic ring-like object (5f) to the downstream was shown, In order to realize the process of <9-I>, use the obturator (5B) of various kinds of composition of <A-4> which was changed to it and described previously, or, As shown in Drawing 11, the stoma (5z) which opens those both sides for free passage to the 1st press plate (5c) may be formed, and the obturator (5B) of composition of permitting passage of a fluid via this stoma (5z) because the compression power to an elastic ring-like object (5f) becomes below predetermined may be used.

\*\*B-2\*\* It changes to a previous example or a method given in the above <B-1>, Although a graphic display is not carried out, the cook which opens and closes the bypass passage while a branch pipe (B) provides independently the bypass passage which passes the upstream and the downstream of the obturator (5B) is provided, In canceling the blockade of the branch pipe (B) by the obturator (5B), it may enable it to make internal pressure of these both portions almost equal by opening this tap wide and making the downstream pass a fluid from the upstream of the obturator (5B).

<B-3> The hydrostatic pressure ON device for pressing fit other fluids, such as air which is convenient even if intermingled with the still more nearly same fluid or it as the fluid to which the inside of a main (A) is conveyed inside the branch pipe (B) of the downstream rather than the obturator (5B), is formed, When the obturator (5B) cancels the blockade of a branch pipe (B), the hydrostatic pressure ON device is operated and it may be made to make internal pressure of the branch pipe (B) of the downstream almost more nearly equal to the internal pressure of the branch pipe (B) of the upstream rather than the obturator (5B). It may constitute so that the operation of the hydrostatic pressure ON device may be performed manually, or it may constitute so that the reduction of compression power to an elastic ring-like object (5f) may be interlocked with and it may be carried out automatically.

\*\*B-4\*\* The process of making internal pressure of the branch pipe (B) of the upstream almost more nearly equal to the internal pressure of the branch pipe (B) of the upstream rather than

the obturator (5B) than the obturator (5B), As the previous example explained the process of which the compression power to the thickness direction to an elastic ring-like object (5f) is canceled, it may carry out in synchronization, or either may be first performed on a target one by one.

\*\*B-5\*\* The concrete composition of the branch pipe shielding device used for this gentleman method can be changed freely suitably, a graphic display is not carried out except that change of <A-1> - <A-3> mentioned above is possible, but only the press plate (5c) of a couple and either of (5d) may be constituted movable.

\*\*B-6\*\* As a terminal unit, it may be a fire hydrant besides the air valve (1) explained in the previous example etc., and can change suitably.

\*\*B-7\*\* As work for a branch pipe done by this gentleman method, there are maintenance work of a slice valve (2) besides the clearing work of the slice valve (2) explained in the previous example, work which infixes other devices in a branch pipe (B) in addition to a slice valve (2), etc.

In order to make contrast with a drawing convenient at the paragraph of a claim, numerals are described, but this invention is not limited to the structure of an accompanying drawing by this entry.

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[Translation done.]

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**TECHNICAL FIELD**

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**[Industrial Application]**

This invention the slice valve for water cutoff infixing in the middle of the branch pipe for terminal units, such as a fire hydrant by which multipoint connection was carried out to the water main, and an air valve, for example, Though returning water with a water main is performed, it is related with the branch pipe shielding device used for a working method for a branch pipe of exchanging where the leakage of water from a branch pipe is prevented, and a method for the same.

By the slice valve infixing in the middle of the branch pipe by which multipoint connection was carried out to the main for <1> fluid transfers about the method in more detail. The process of intercepting said branch pipe, the process of removing the terminal unit with which the end of the <2> aforementioned branch pipe was equipped, \*\*3\*\* The process of equipping the end of said branch pipe with a lid, and blockading the end opening of the branch pipe, \*\*4\*\* The process of opening said slice valve, the process which moves the obturator which carried out sliding operation of the operating shaft which penetrates the <5> aforementioned lid for a shaft core direction by a sealed state enabling free sliding, and was provided in inner one end of the operating shaft even to an upstream section rather than said slice valve, \*\*6\*\* By carrying out approach moving operation of the press plate of a couple attached to inner one end of said operating shaft in a shaft core direction, The process of blockading said branch pipe by carrying out elastic deformation to the diameter expanded state which compresses the elastic ring state infixing between the press plate from a shaft core direction, and is stuck to the inner circle wall of a branch pipe, \*\*7\*\*. Finishing [ the process of removing said slice valve, and <8> maintenance work ] Or the process of attaching a new slice valve, the process which cancel the compression to the elastic ring-like object by the <9> aforementioned press plate and of which the blockade of said branch pipe by the obturator is canceled, \*\*10\*\* The process of removing said lid after intercepting said branch pipe by the process and the <11>

aforementioned slice valve to which said obturator is moved until it is accommodated in said lid, \*\*12\*\* After equipping with a terminal unit, it is related with the process of opening said slice valve, and an opposite [ \*\* and others ] branch pipe working method.

On the other hand, the lid with which the end of the pipe portion which connects with the downstream end of the slice valve or it so that the end opening of the branch pipe with which multipoint connection was carried out to the main for fluid transfers, and the slice valve was infixed in the middle about the device may be blockaded can be equipped, providing the 1st tubed operating shaft that penetrates this lid for a shaft core direction by a sealed state enabling free sliding, and the 2nd operating shaft that penetrates the inside of this 1st operating shaft enabling free sliding -- inner one end of these 1st operating shafts and the 2nd operating shaft -- each, while attaching another press plate, It is related with the branch pipe shielding device which has infixed the elastic ring-like object which carries out elastic deformation to the diameter expanded state stuck to the inner circle wall of said branch pipe by the compression from the shaft core direction by the press plate of these couples, and shields between the inner circle wall and peripheral part of the press plate of said couple between the press plates of these couples.

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**PRIOR ART****[Description of the Prior Art]**

When doing the work for a branch pipe of exchange of the slice valve of infixation to the branch pipe mentioned above, etc., in the former. In the process of <9> mentioned above, after attaching a new slice valve, the blockade of the branch pipe by the obturator, He was trying to cancel by carrying out elastic restoration modification to the diameter reduced state which warms the compression power from a shaft core direction to the elastic ring-like object of the obturator, and a crevice produces between the inner circle walls of a branch pipe (literature cannot be mentioned).

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**EFFECT OF THE INVENTION****[Effect of the Invention]**

As a result, even if it was in the situation of conveying a fluid with high voltage in a main even if, unblocking of a branch pipe can be smoothly performed by canceling the compression to an elastic ring-like object, and the efficiency of the work for a branch pipe of a maintenance and exchange of a slice valve could be raised.

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**MEANS**

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problem which [invention tends to solve

However, when based on a conventional method mentioned above, there were the following problems.

That is, where a finishing maintenance or new slice valve is attached. Since it is acting to an elastic ring-like object as power in which differential pressure of hydrostatic pressure of the upstream and atmospheric pressure of the downstream pushes the elastic ring-like object against an inner circle wall of a branch pipe, and a press plate of the downstream, Even if it cancels compression to an elastic ring-like object by a press plate, an elastic ring-like object, It is held at the state of it being pushed against a press plate of the downstream, and an inner circle wall of a branch pipe by the aforementioned differential pressure, and sticking by it, and when unblocking of a branch pipe is no longer performed smoothly and especially a fluid is conveyed with high voltage in a main, remarkable working efficiency causes a fall.

The purpose of the 1st invention is to provide conventionally the working method for a branch pipe which can perform unblocking of a branch pipe smoothly in view of the actual condition, and the purpose of the 2nd invention has it in providing a useful branch pipe shielding device for using for such a working method for a branch pipe.

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## **OPERATION**

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### **[Function]**

That is, since the internal pressure of the upstream of the obturator and the downstream becomes [ according to the working method for a branch pipe of the 1st invention ] almost the same in canceling the blockade of a branch pipe, when the compression to the elastic ring-like object by a press plate is canceled, The power resulting from the differential pressure of the internal pressure of the branch pipe which will push an elastic ring-like object against the press plate of the downstream to it and the inner circle wall of a branch pipe is almost lost, and an elastic ring-like object carries out elastic restoration modification easily at the diameter reduced state which a crevice produces between the inner circle walls of a branch pipe.

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**EXAMPLE**

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**[Example]**

Hereafter, the example of this invention is described based on a drawing.

First, in advance of explanation of the working method for a branch pipe by the 1st invention, the branch pipe shielding device by the 2nd invention used for it is explained.

As shown in Drawing 3, while multipoint connection of this branch pipe shielding device is carried out to the water main (A) of burial to underground and it connects an air valve (1) to that end, In the case where said stop valve (2) of the branch pipe (B) which infixes the stop valve (2) which is an example of a slice valve in the middle is exchanged, Among said branch pipes (B), it is a device for cutting off water in the state of permitting exchange of said stop valve (2), and the pipe portion (3) of the upstream of a stop valve (2) consists of a water cutoff machine (5) and a fixing means (6).

The manhole lid (B<sub>1</sub>) which carries out the flange connection of said branch pipe (B) to the pipe tee with a flange of a water main (A) in the large caliber part by the side of an end, It comprises a valve box (B<sub>2</sub>) of said stop valve (2) which carries out a flange connection to the small caliber end of this manhole lid (B<sub>1</sub>) at the end side, and a short pipe for air valve attachment (B<sub>3</sub>) which carries out a flange connection to the other end of this valve box (B<sub>2</sub>).

The upstream pipe portion (3) used as the candidate for water cutoff is a byway pipe portion of said manhole lid (B<sub>1</sub>).

As shown in 1st [ \*\* ] figure (\*\*) and Drawing 2, a flange connection is possible for said lid (4) to the other end of the stop valve (2) so that the other end opening by which the short pipe (B<sub>3</sub>) of said stop valve (2) was removed may be blockaded, and it is a thing of the vessel shape in which an inner package is possible about said water cutoff machine (5).

Said water cutoff machine (5) comprises the operating shaft (5A) which penetrates the axis part of said lid (4) for a shaft core direction by a watertight state enabling free sliding, and the obturator (5B) attached to inner one end of this operating shaft (5A), as shown in 1st [\*\*] figure (\*\*\*) and Drawing 2.

Said operating shaft (5A) comprises the 2nd operating shaft (5b) that penetrates the inside of the 1st tubed operating shaft (5a) and this 1st operating shaft (5a) to a watertight state.

The 1st press plate (5c) that said obturator (5B) attached to the inner end of the 1st operating shaft (5a) of said operating shafts (5A), It is attached to inner one end rather than the 2nd press plate (5d) made to attach outside the toe of the 2nd operating shaft (5b) of said operating shafts (5A), enabling a free slide, By shaft core direction sliding by the side of the outer edge to the 1st operating shaft (5a) of said 2nd operating shaft (5b). The pressing operation implement (5e) which makes the 1st press plate (5a) carry out approach movement of said 2nd press plate (5d), It is compressed from a shaft core direction at both press plates (5c) and (5d) with approach movement of said 2nd press plate (5d), and both blocking plates (5c) and the elastic ring-like object (5f) which carries out diameter expansion deformation elastically so that the crevice between the peripheral part of (5d) and the inner circle wall of an upstream pipe portion (3) may be blockaded are comprised.

And said both press plates (5c) and (5d), It is formed in the byway rather than the minimum inside diameter of the branch pipe (B) so that the inside of a branch pipe (B) can be moved to a shaft core direction, and it is formed so that an elastic ring-like object (5f) may become a byway rather than the minimum inside diameter of said branch pipe (B) similarly in the natural state of which compression was canceled. The projection (5g) for the prevention from omission which carries out an engagement hold to an elastic ring-like object (5f) is formed in the 2nd press plate (5d).

As shown in said elastic ring-like object (5f) in Drawings 4 and 5, two or more notches (5x) are formed in the 1st press plate (5c) side along the hoop direction. This notch (5x) is closed by the elastic deformation of an elastic ring-like object (5f) in the state of compression, and forms the channel (F) which compression power is wide opened in the state below predetermined, and opens the both sides of this elastic ring-like object (5f) for free passage.

Although it will explain later, After a new stop valve (2) was attached at the time of the clearing work of a stop valve (2), In canceling the blockade of the branch pipe (B) by said obturator (5B), From the upstream of an elastic ring-like object (5f), are wide opened because the press plate (5c) of said couple and the compression power by (5d) become below predetermined, pass the downstream, and a fluid by that cause, It is for making almost equal internal pressure of the both-sides portion of an elastic ring-like object (5f), carrying out elastic restoration modification of the elastic ring-like object (5f) smoothly to a natural state, and making unblocking of a branch pipe (B) perform convenient.

As said fixing means (6) is shown in 1st [ \*\* ] figure (\*\*\*) and Drawing 2, while attaching to inner one end of said water cutoff machine (5) the braces (6A) which can be detached and attached freely to the major-diameter portion of said manhole lid (B<sub>1</sub>), the braces (6a) which use the

heel of said 2nd operating shaft (5b) as a final controlling element (6a) -- the final controlling element (6B) of business is included in a water cutoff machine (5), and it is constituted.

Said braces (6A) between the other end of said 2nd operating shaft (5b), and the 2nd press plate (5d) of the obturator (5B), When the 2nd operating shaft (5b) is in the sliding position which makes a pressing operation implement (5e) contact the 2nd press plate (5d) to the 1st operating shaft (5a), It is refracted to the type of \*\* and the method of outside is made to project so that the projection (6b) of formation to the refraction pars intermedia may be made to engage with the major-diameter portion of said manhole lid (B<sub>1</sub>) from a shaft core direction,

When the 2nd operating shaft (5b) is in the sliding position which separates set distance from the 2nd press plate (5d) and in which a pressing operation implement (5e) is located to the 1st operating shaft (5a), It is constituted by separating an interval to a hoop direction and infixing in it the plurality of a link (6c) which is mostly located in linear shape and locates said projection (6b) in an inner direction rather than the minimum inside diameter of a branch pipe (B).

That is, braces (6A) to a link (6c) by engagement to the major-diameter portion of the manhole lid (B<sub>1</sub>) of a projection (6b) of formation. By preventing movement by the side of the water main (A) of a water cutoff machine (5) with the water pressure which prevents movement by the side of the water cutoff edge (2) of a water cutoff machine (5), and acts on a water cutoff machine (5). A water cutoff machine (5) is fixed so that the obturator (5B) may be located in the byway pipe portion (3) of a manhole lid (B<sub>1</sub>).

said braces (6A) -- the operating tool (6B) of business has said 2nd operating shaft (5b), and is made to serve a double purpose.

A branch pipe shielding device is screwed in the outer edge side of the 2nd operating shaft (5b) of said operating shafts (5A), It has the 1st presser-foot implement (8) attached outside the nut for compression operation (7) which presses the outer edge of the 1st operating shaft (5a) on inner one end, and near the outer edge of said 1st operating shaft (5a) enabling free attachment and detachment, and the 2nd presser-foot implement (9) make free the crown of the attachment and detachment of to the outer edge of said 2nd operating shaft (5b).

Said 1st presser-foot implement (8) by making the 1st hook (8a) of the attachment to it engage with the projection (4a) of formation to said lid (4) in the mounting state to the 1st operating shaft (5a), Preventing movement to the method of the outside which receives the lid (4) of the 1st operating shaft (5a), the fixing means to the 1st operating shaft (5a) of this 1st presser-foot implement (8) is a means to make set bolts (11) engage with the circumferential groove (10) of

formation to the 1st operating shaft (5a).

Said 2nd presser-foot implement (9) prevents sliding to the method of the outside which receives the 1st operating shaft (5a) of the 2nd operating shaft (5b), when the 2nd hook (8b) of the attachment to said 1st presser-foot implement (8) engages with it in the mounting state to the 2nd operating shaft (5b).

In addition, the heel of the 2nd operating shaft (5b) of said operating shafts (5A) is formed in the different diameter part (12) for carrying out the baffle of the 2nd operating shaft (5b).

The nut for said compression operation (7) is formed in the size settled in the outside of the 1st operating shaft (5a) so that the extract to inner one end from the lid (4) of a water cutoff machine (5) may be permitted.

It is opened and closed by the lid (4) with a plug (13), and the water cutoff check mouth (14) to which the water in a lid (4) is made to emit in an opened state is formed in it.

Next, the clearing work of the stop valve using an above branch pipe shielding device (2) is taken for an example, and a process is explained for the working method for a branch pipe of the 1st invention later on.

\*\*1\*\* Close a stop valve (2) and intercept a branch pipe (B).

\*\*2\*\* As shown in 1st [ \*\* ] figure (\*\*), remove the air valve (1) which is an example of a terminal unit from every short pipe (B<sub>3</sub>) and a stop valve (2).

\*\*3\*\* As shown in 1st [ \*\* ] figure (\*\*), attach the lid (4) holding a water cutoff machine (5) to a stop valve (2), and blockade the end opening of a branch pipe (B). In this case, a water cutoff machine (5) is in the state where sliding to the method of the outside which receives the 1st operating shaft (5a) of the 2nd operating shaft (5b) beforehand by the 1st, the 2nd presser-foot implement (8), (9), and the 2nd hook (8b) was prevented, and braces (6) are in a diameter reduced state.

\*\*4\*\* Open a stop valve (2).

\*\*5-\*\*\*\* As shown in 1st [ \*\* ] figure (\*\*), by pressing the 1st operating shaft (5a) of the operating shafts (5A), make obturator (5B) \*\* move braces (6A) into an upstream manhole lid (B<sub>1</sub>) from a stop valve (2), and hold in the position by the 1st hook (8a).

\*\*5-\*\*\*\* As shown in 1st [ \*\* ] figure (\*\*), while removing the 2nd hook (8b) from the 2nd presser-foot implement (9), remove the 2nd presser-foot implement (9) from the 2nd operating shaft (5b), and make the link (6c) of braces (6A) refracted by pulling water pressure and the 2nd operating shaft (5b).

\*\*5-\*\*\*\* By removing the 1st hook (8a), pulling up the 1st operating shaft (5a), and moving a water cutoff machine (5) to the method side of outside, as shown in 1st [ \*\* ] figure (\*\*), The projection (6b) of the refracted link (6c) is made to engage with an ON hole lid (B<sub>1</sub>), and a water cutoff machine (5) is fixed at the same time it makes the obturator (5B) of that introduce

in the byway pipe portion (3) of a manhole lid (B<sub>1</sub>).

\*\*6\*\* As shown in 1st [ \*\* ] figure (\*\*), where the baffle of the 2nd operating shaft (5b) is carried out, screwing operation of the nut for compression operation (7) is carried out, Push the 1st press plate (5c) against the 2nd press plate (5d) side, compress it, carry out elastic deformation of the elastic ring-like object (5f) to a diameter expanded state, the inner circle wall of a branch opening is made to carry out press adhesion, and water is cut off. Then, open a plug (13), water is made to drain off from a water cutoff check mouth (14), and water cutoff is checked because the tail water stops, and the 1st presser-foot implement (8) is removed.

\*\*7\*\* As shown in 1st [ \*\* ] figure (\*\*), cancel connection with the manhole lid (B<sub>1</sub>) of a stop valve (2), and extract from a lid (4) every water cutoff machine (5) to the method side of outside.

The above is the removing operation of the stop valve (2) of the first half of the work for a branch pipe, the stop valve (2) of the second half of the work for a branch pipe is exchanged, and next mounting work is work which performs the reverse of the above operation. <8> -- a new stop valve (2) is attached to a lid (4), and after equipping a water cutoff machine (5) and connecting a stop valve (2) to an ON hole lid (B<sub>1</sub>), the 1st presser-foot implement (8) is

attached to the operating shaft (5A) of a water cutoff machine (5). [ namely, ] The state where this process was completed is the same as the state which shows to 1st (\*\*).

\*\*9-\*\*\*\* Make internal pressure of the branch pipe (B) of the downstream almost more nearly equal to the internal pressure of the branch pipe (B) of the upstream from the obturator (5B) than the obturator (5B). This process is specifically loosening screwing of the nut for compression operation (7) a little, and making below predetermined compression power to the press plate (5c) of a couple, and the elastic ring-like object (5f) by (5d), It is carried out by making the downstream pass a fluid on an elastic ring-like object (5f) from the upstream of an elastic ring-like object (5f) via the notch (5x) of formation, and making the inside of the branch pipe (B) of the downstream of an elastic ring-like object (5) full [ object ] of a fluid. By performing this process, the difference of the internal pressure of the branch pipe (B) of the both sides of the obturator (5B) is almost lost, Since the pressing force by the side of the inner circle wall of the 1st press plate (5c) and branch pipe (B) to the elastic ring-like object (5f) resulting from the differential pressure is almost lost, Only by the operation which loosens the compression power to the elastic ring-like object (5f) in the process of following <9-RO>, the blockade of a branch pipe (B) can be smoothly canceled now.

\*\*9-\*\*\*\* Although carried out in synchronization with the process of the above <9-I>, loosen the nut for compression operation (7) further, and cancel the compression power to the thickness direction to an elastic ring-like object (5f). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (\*\*).

\*\*10-\*\*\*\* While canceling engagement on the manhole lid ( $B_1$ ) of a projection (6b) of the link (6c) refracted by depressing the 1st operating shaft (5a) and moving a water cutoff machine (5) to the inner direction side, The obturator (5B) is made to slip out of the byway pipe portion (3) of a manhole lid ( $B_1$ ), and the 1st hook (8a) is made to engage with the projection (4a) of formation to a lid (4). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (\*\*).

\*\*10-\*\*\*\* Expand the link (6c) of braces (6A), attach the 2nd presser-foot implement (9) to the 2nd operating shaft (5b), and make the 2nd hook (8b) engage with the 2nd presser-foot implement (9) by depressing the 2nd operating shaft (5b). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (\*\*).

\*\*10-\*\*\*\* Remove the 1st hook (8a), pull up the 1st operating shaft (5a), and move the obturator (5B) and braces (6A) until it is accommodated in a downstream lid (4) from a stop valve (2).

\*\*11\*\* Cancel connection with the stop valve (2) of a lid (4), and remove a water cutoff machine (5) every lid (4), after intercepting a branch pipe (B) by a stop valve (2) (this state is the same as the state which shows in 1st [ \*\* ] figure (\*\*)). The state where this process was completed is the same as the state which shows in 1st [ \*\* ] figure (b).

\*\*12\*\* Connect to a stop valve (2) the short pipe ( $B_3$ ) which attached the air valve (1) which is a terminal unit, and open a stop valve (2). The state where this process was completed is the same as the state which shows in Drawing 3. At this time, it may be the same, or or an air valve (1) may be new. [ a maintenance ]

Above, the clearing work of the stop valve (2) which is an example of the work for a branch pipe is completed.

[Translation done.]

**\* NOTICES \***

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damages caused by the use of this translation.**

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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## **DESCRIPTION OF DRAWINGS**

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### **[Brief Description of the Drawings]**

In drawing of longitudinal section of a branch pipe shielding device, and Drawing 3, an important section expanded sectional view and Drawing 5 of the sectional view of targeted piping and Drawing 4 are [ the sectional view and Drawing 2 for which Drawings 1 thru/or 5 show the example of the working method for a branch pipe concerning this invention, and a branch pipe shielding device, and 1st / \*\* / figure (b) thru/or (\*\*\*) show a process of operation ] top views of an elastic ring-like object. The important section sectional view and Drawing 11 in which Drawings 6 thru/or 10 show another example of a branch pipe shielding device are an important section sectional view of the branch pipe shielding device in which another example of the working method for a branch pipe is shown.

(A) .... a main and (B) .... a branch pipe and (1) .... a terminal unit and (2) .... a slice valve and (4) .... a lid and .... (5A) -- an operating shaft, the obturator (5B), and .... (5a) -- the 1st operating shaft and .... (5b) -- the 2nd operating shaft, (5c), and .... (5d) -- a press plate and .... (5f) -- An elastic ring-like object and (F) .... a channel.

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**[Translation done.]**

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**[Translation done.]**

**\* NOTICES \***

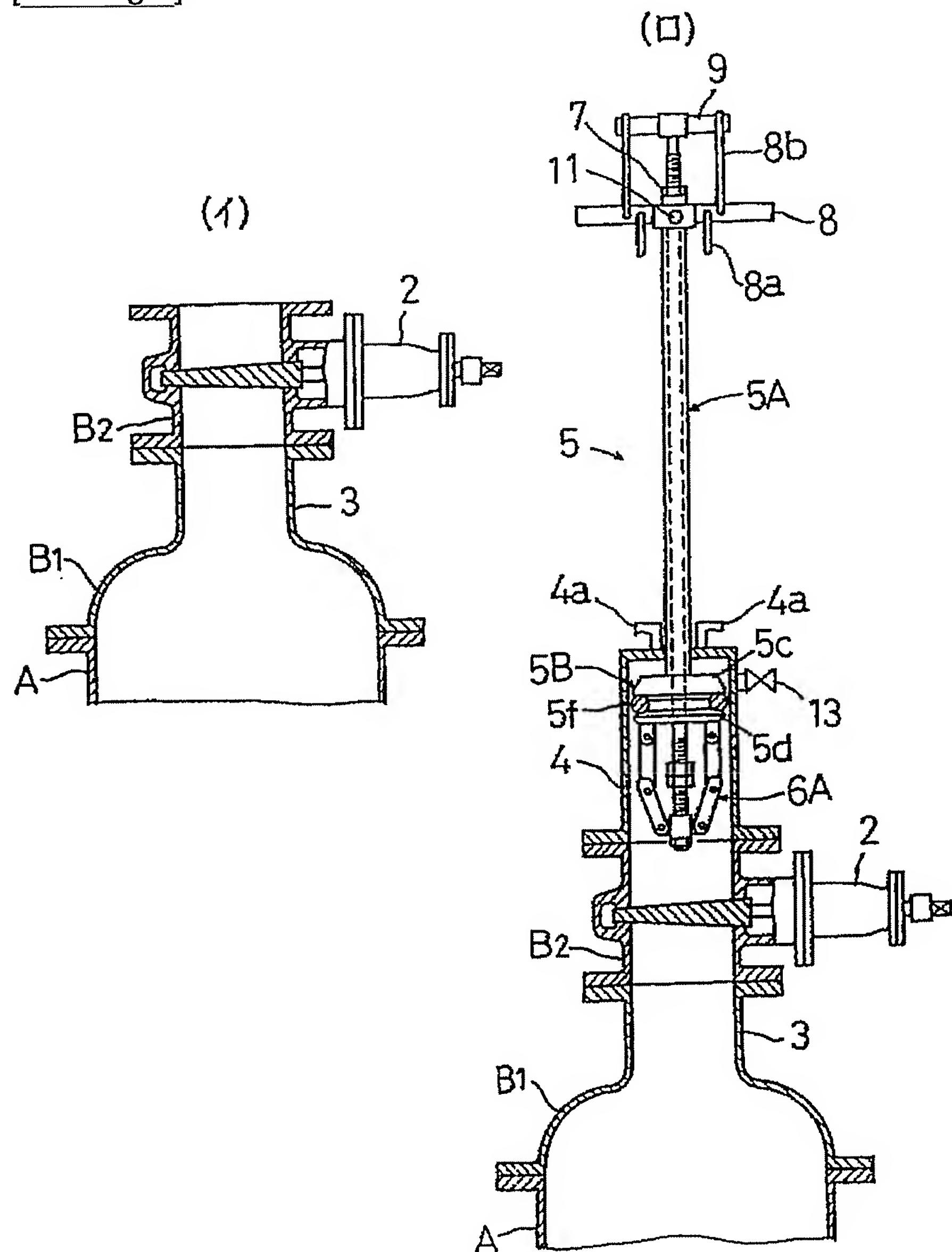
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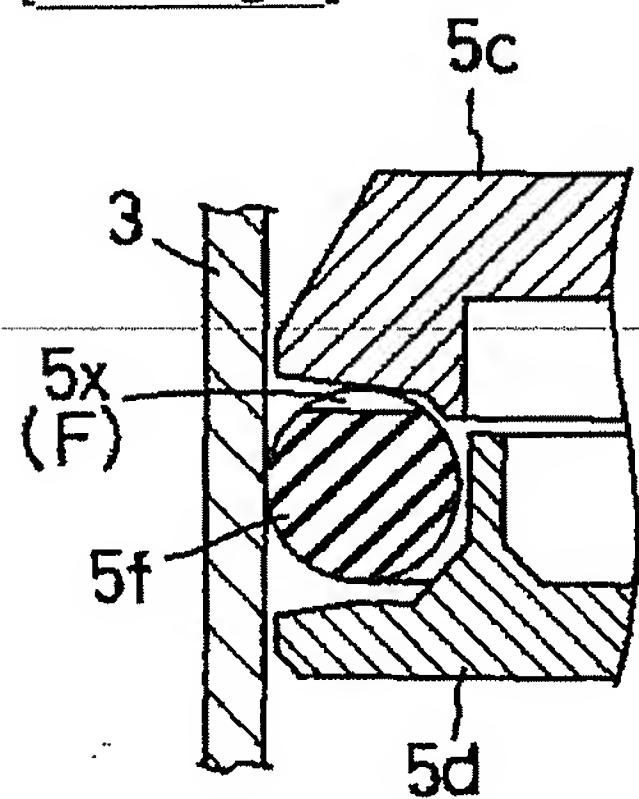
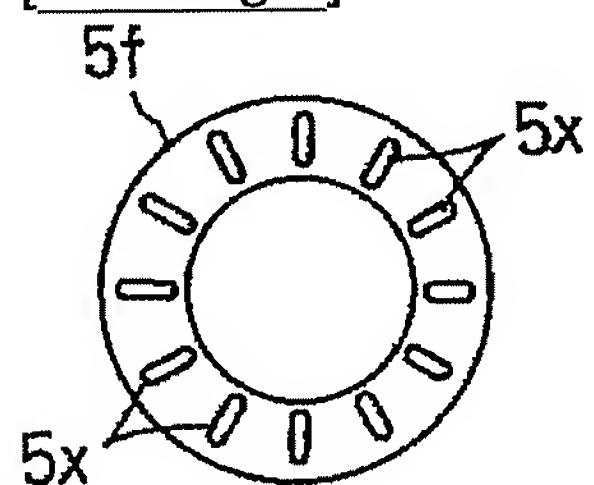
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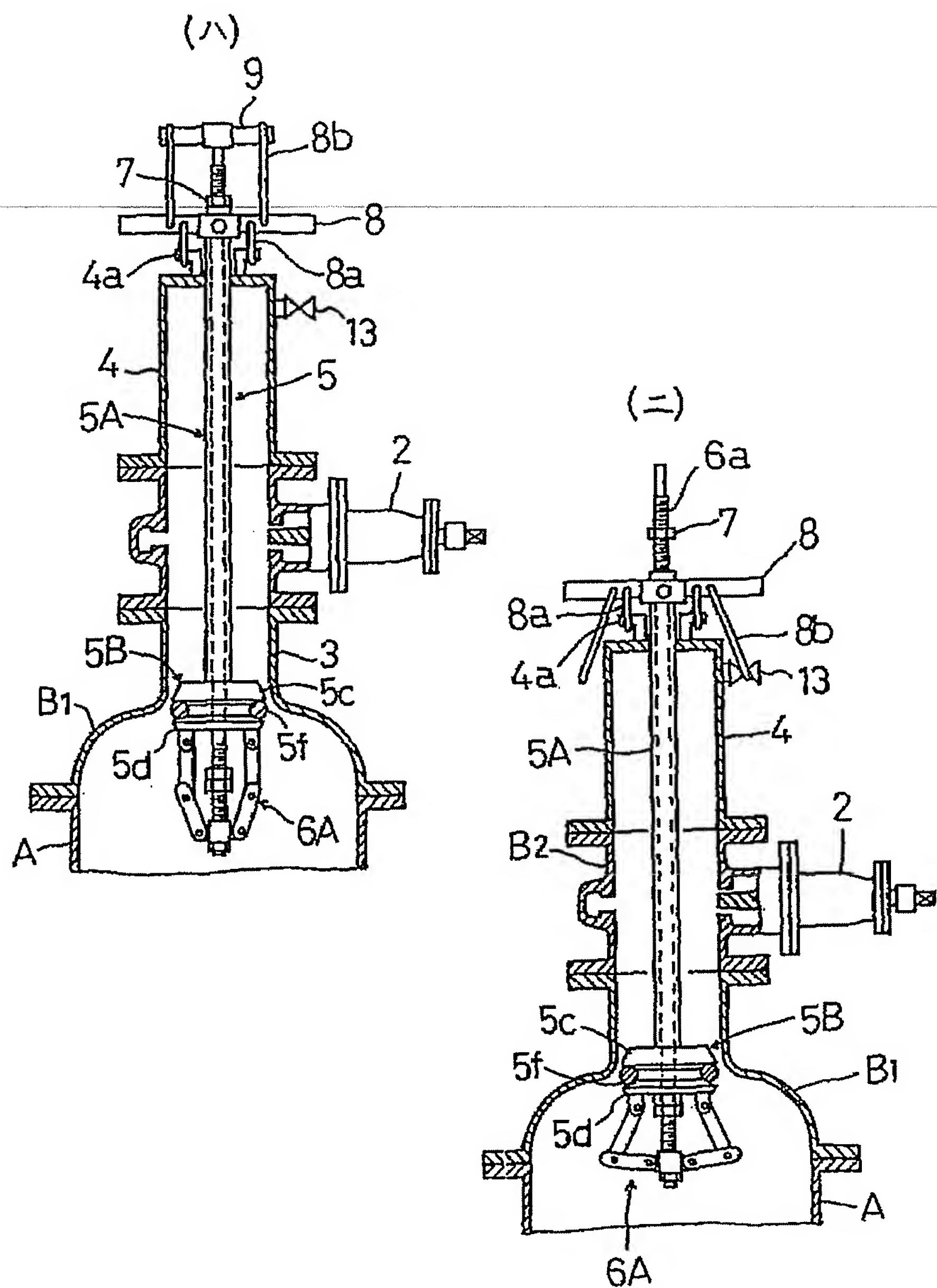
**DRAWINGS**

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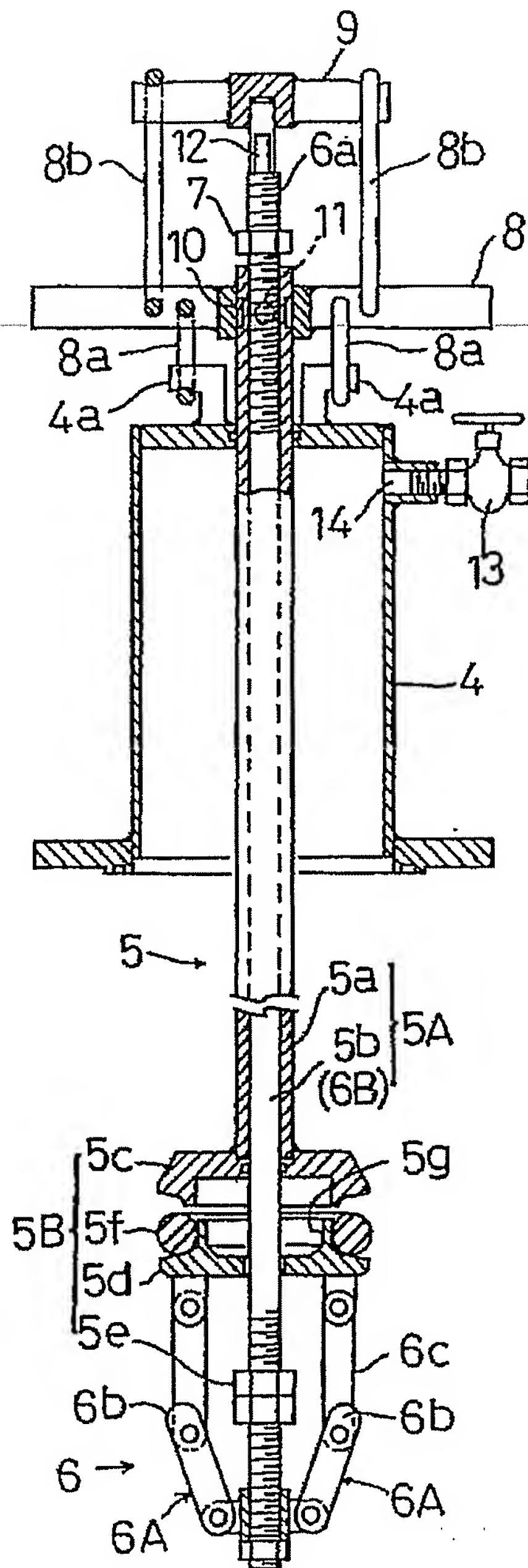
**[Drawing 1]**

[Drawing 4][Drawing 5]

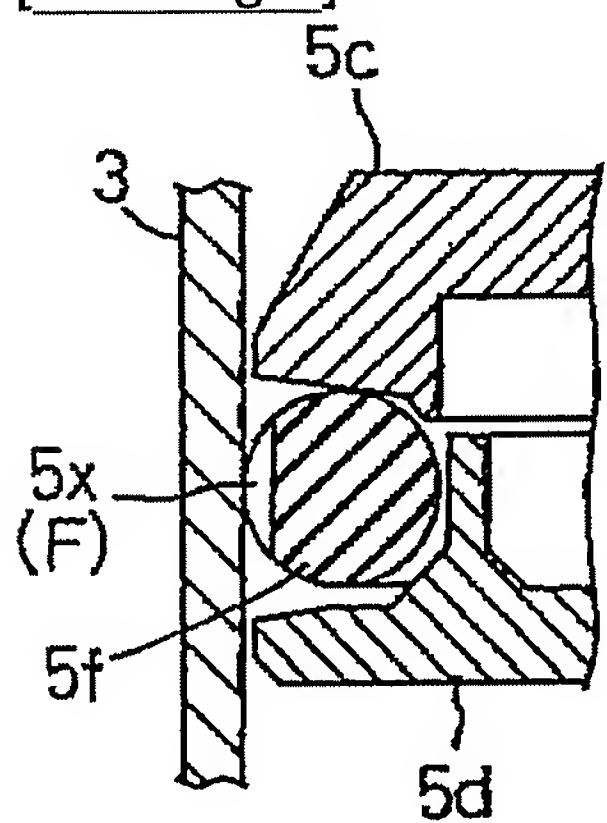
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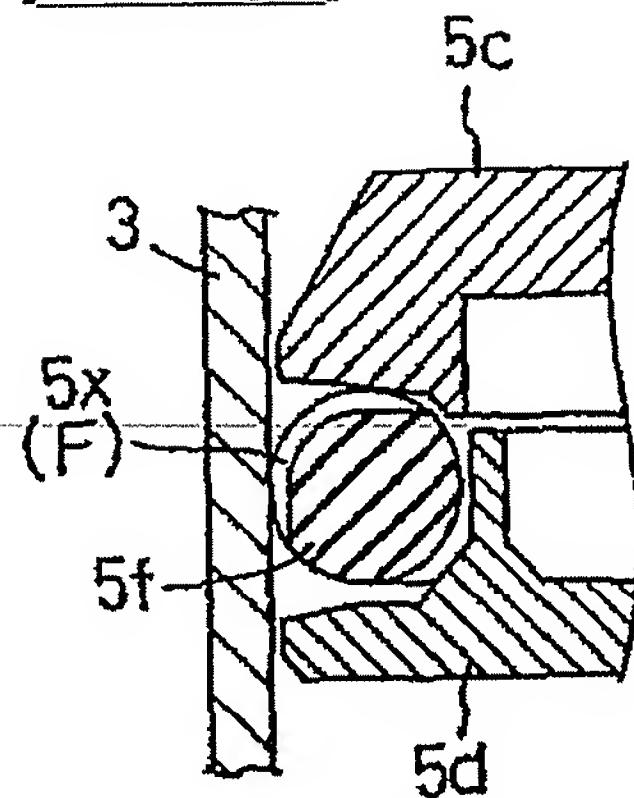
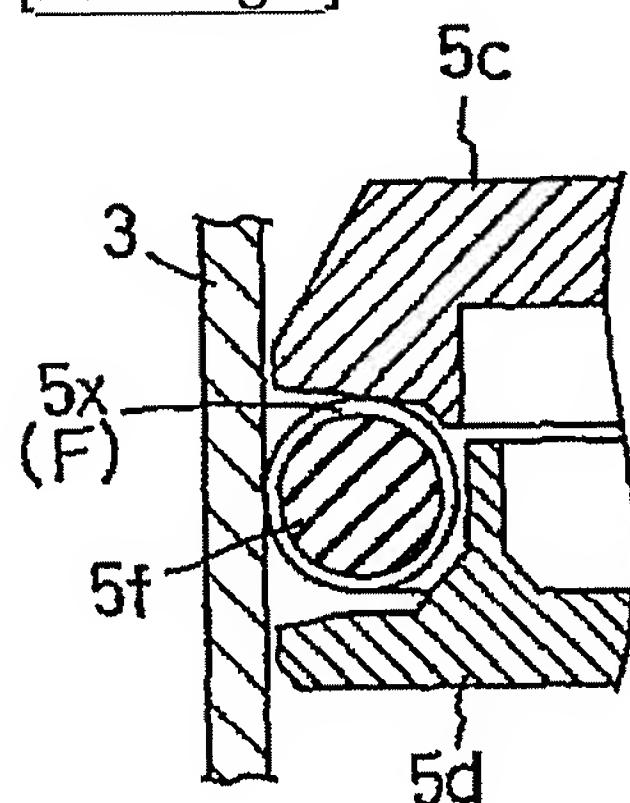
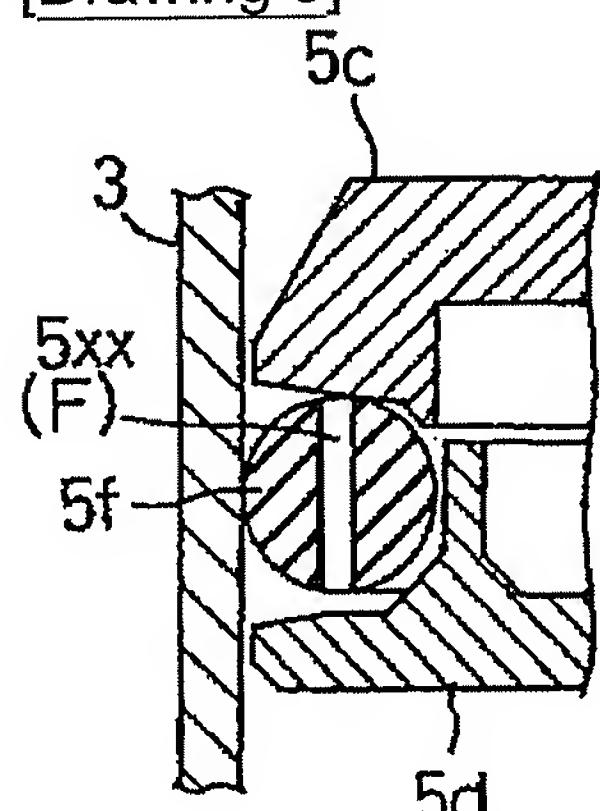


[Drawing 2]

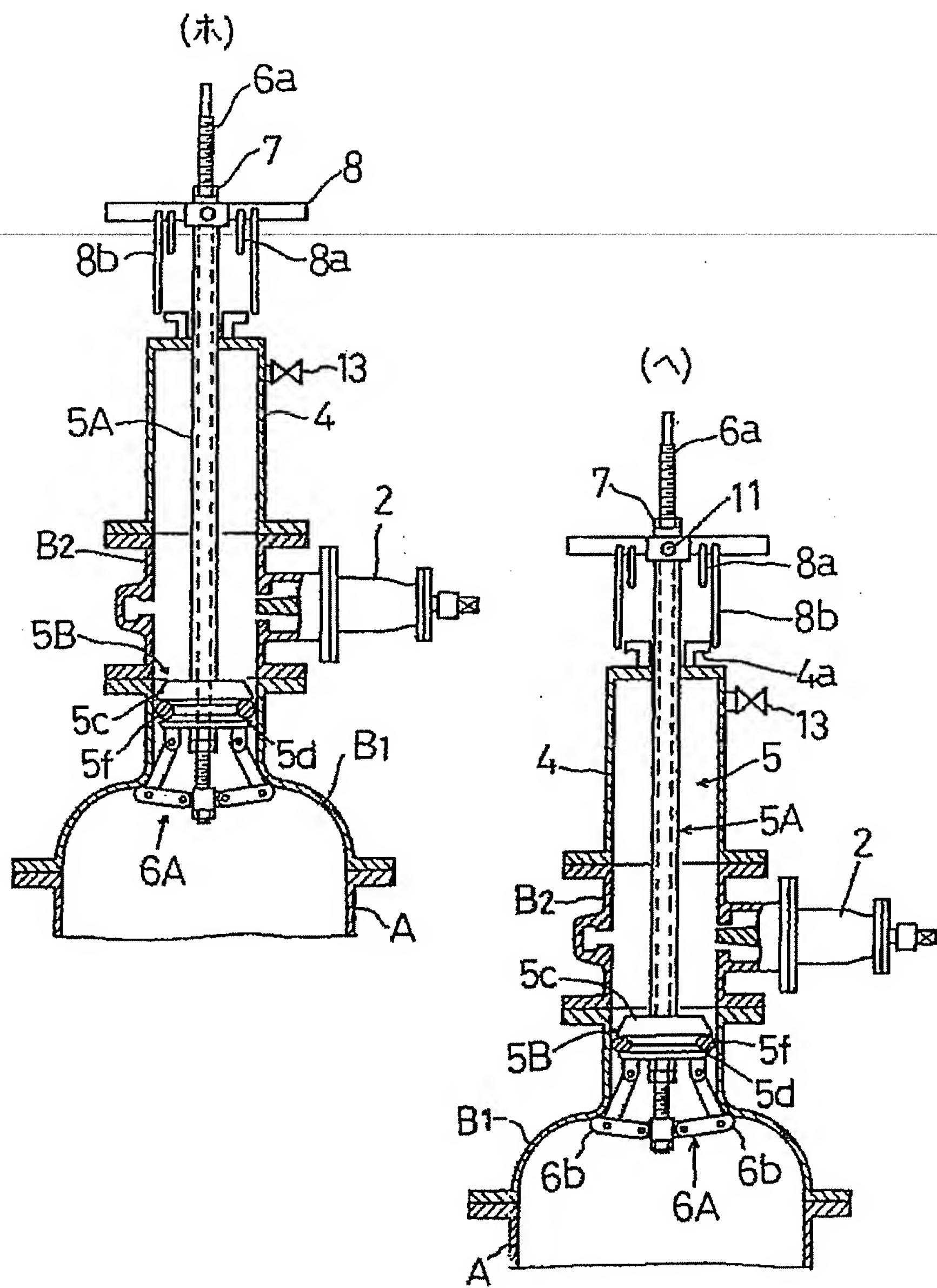


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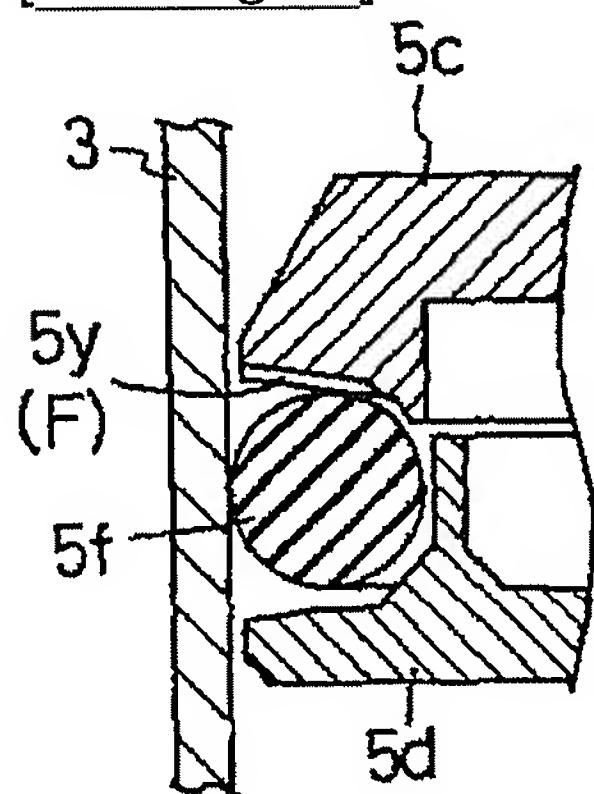


[Drawing 7][Drawing 8][Drawing 9]

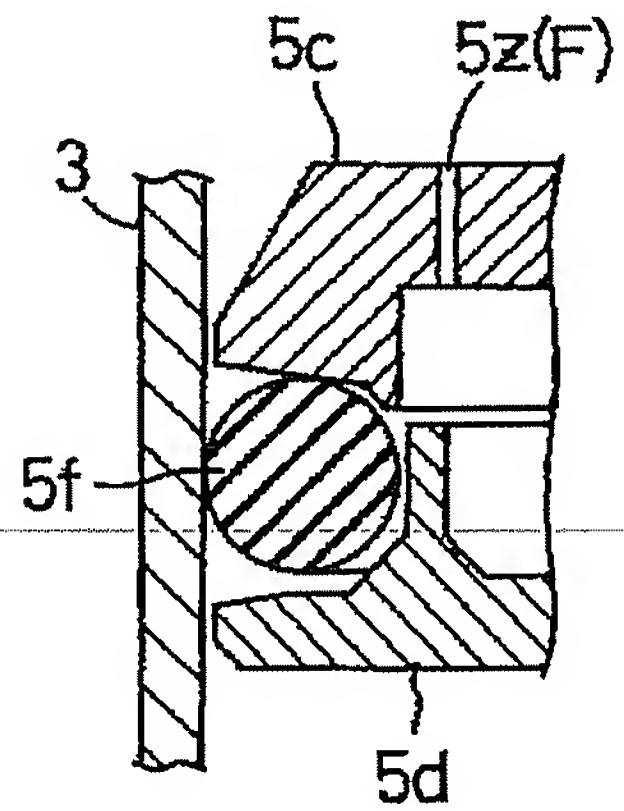
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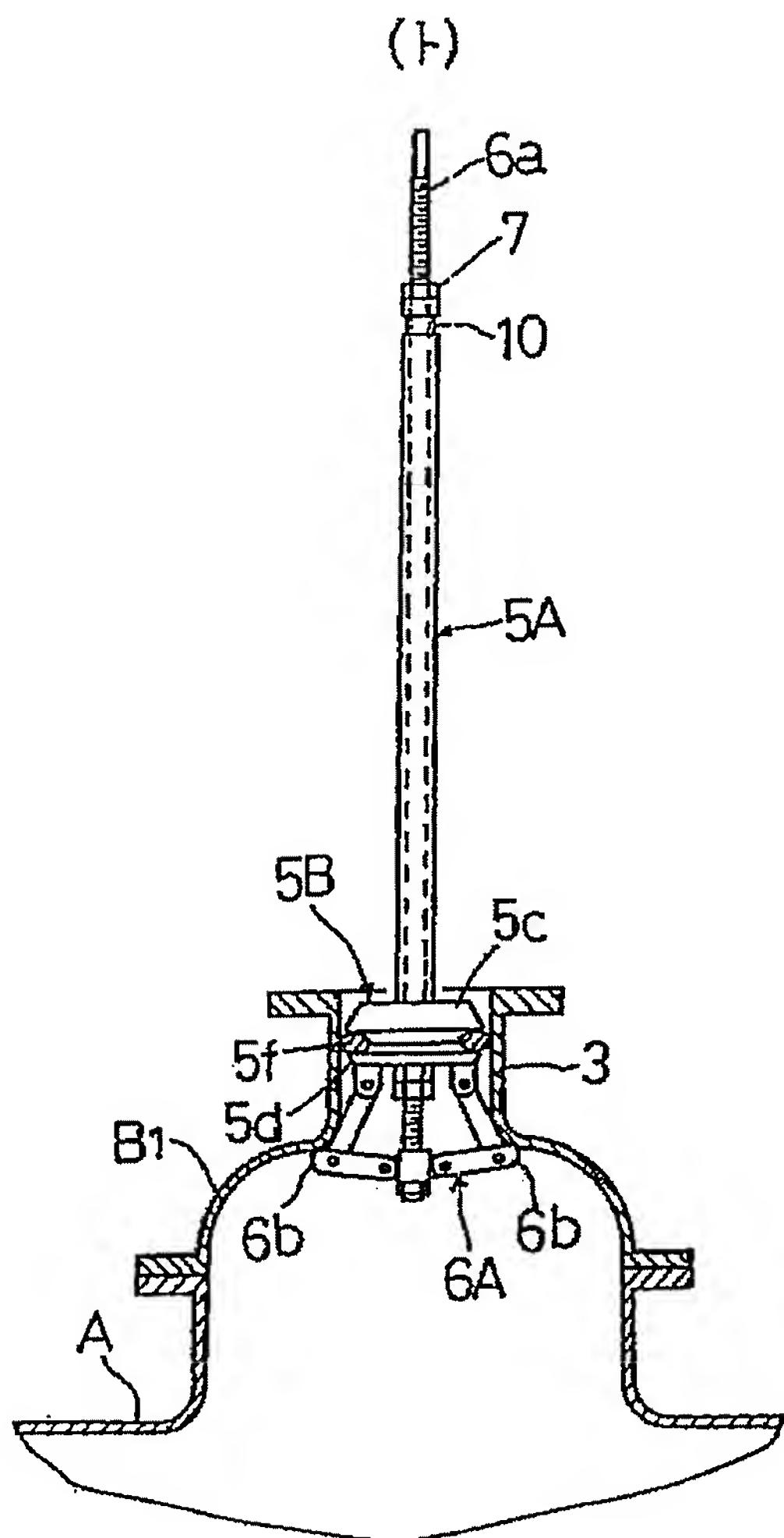
[Drawing 10]



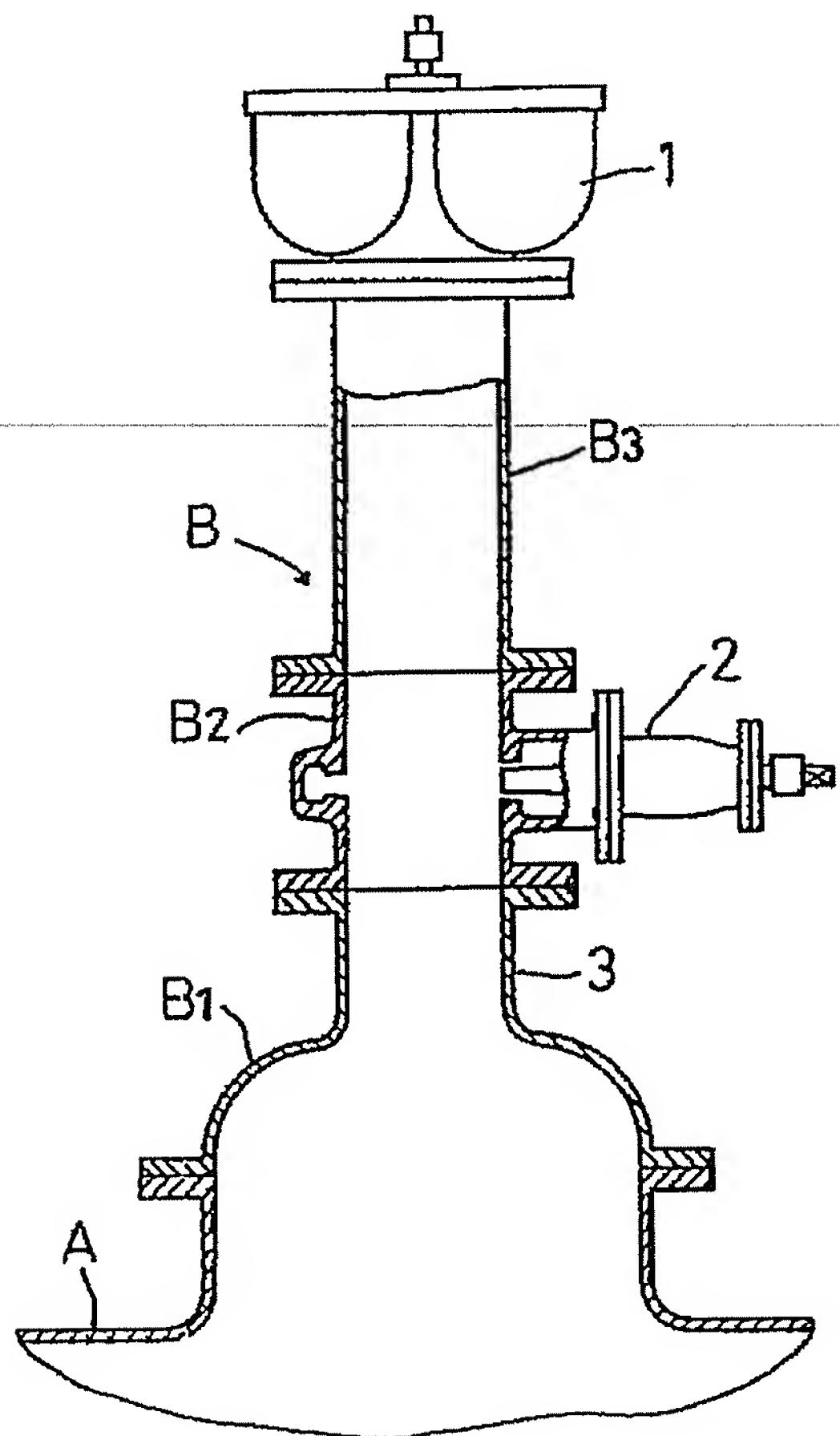
[Drawing 11]



【第1図】



[Drawing 3]



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[Translation done.]